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The Clinical Significance of So-Called Chronic Appendicitis*†

By JULIUS FRIEDENWALD, M.D., F.A.C.P., and THEODORE H. MORRISON, M.D., F.A.C.P., *Baltimore, Maryland*

MANY conflicting views concerning the significance of chronic appendicitis have been held during the past 10 to 15 years. While some clinicians have attributed many disturbances occurring in the abdomen to this cause, others have held that it in itself has but slight clinical significance. According to the latter conception, so-called chronic appendicitis is not a disease in which the symptoms are due entirely to the appendix alone, but one in which many other abdominal as well as other factors play an important rôle.

It is a well recognized fact, that since the advent of roentgenology numerous variations in the size, shape and position of the appendix have been observed, which have been recorded as chronic changes in this organ. In a considerable number of these reports, great significance has been attached to these findings as a probable cause of many digestive symptoms. Operation has been frequently undertaken upon the basis of

this observation alone. As the result of this procedure, namely, appendectomy, unfavorable outcomes have been recorded in many instances. These failures have led to a further study of this subject. As a result the McBurney incision has now ordinarily been discarded, and other abdominal disturbances have often been observed as the cause of the symptoms.

If the embryology of the appendix is carefully studied, the cause of many errors in diagnosis becomes apparent. This organ is derived from the cecum as a pouch about the seventh or eighth week of fetal life. The cecum occupies a high position under the liver during early development but descends lower later and drags the appendix down with it. The appendix finally assumes its position in the right iliac fossa; but the attachment to the cecum may vary markedly. In 90 per cent of instances, according to Treves, it occupies a medioposterior position. The direction of the appendix is determined by the position of the attachment as well as the length of the mesoappendix. It may be directed posterior or lateral to the cecum and colon or into the pelvis beneath the terminal ileum or upward in the direction of the gall bladder. The meso-

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†Delivered at the Baltimore Meeting of the American College of Physicians, March 23, 1931.

appendix may vary in shape and position and may determine certain peculiarities in the clinical manifestations of the diseased appendix. It is evident, that many of the variations in shape, size and position of the appendix may be due entirely to embryological conditions, presenting in no manner evidence of inflammatory processes, and are entirely compatible with normal health. Furthermore, when chronic disease of the appendix actually does occur, it is a well recognized fact, that this often represents but a part of the disease of the entire digestive tract. Gastro-intestinal infections rarely occur as single lesions, but are usually multiple and such affections as chronic appendicitis, chronic cholecystitis and peptic ulcer are not uncommonly associated. Heyd, Killian, and MacNeal,¹ and, more recently, Deaver,² attribute the primary inflammation in most instances to the appendix from which extension takes place into the liver and finally into the gall bladder. The formation of peptic ulcer may also represent a stage in this process. Inasmuch, therefore, as chronic gastro-intestinal infections extend gradually throughout the entire digestive tract the symptoms must vary according to the sites most markedly involved in the infection as well as with their anatomical and physiological characteristics. It is evident that an organ with a small outlet like the appendix or a small duct like the gall bladder might produce more severe manifestations as a result of infection than a large organ such as the liver. A knowledge that these infections often involve numerous areas of the digestive tract simultaneously will not

infrequently explain the development of new symptoms or the persistence of old ones.

Inasmuch as the appendix is constituted with a small lumen, when undergoing chronic inflammatory changes it will necessarily have its function interfered with. The contents of the cecum will enter the appendix under these conditions and decomposition take place with damage to the muscular wall. This will finally lead to disturbances of the functions of the cecum and ileum with extension into the colon, frequently increased by the deforming complications due to adhesions.

In this connection the work of Rohdenberg³ is of interest. In a pathological study of a large number of chronic appendices, he noted that the first changes occur in the tip, consisting of round cell infiltration about the Meissner ganglia, which increases until the ganglia are completely buried in round cells. Fibrosis now takes place until the ganglia are enveloped in dense fibrous tissue. From these observations he concludes that so called chronic appendicitis is a productive inflammation originating as a lesion of the sympathetic nervous system, which is not restricted to the appendix alone but involves the splanchnic sympathetic nervous system in general. According to Rohdenberg, the nerve lesions would explain reflex gastric symptoms such as attacks of spasm in the gastro-intestinal tract and pain, as well as the frequent absence of relief following appendectomy.

In order to establish the presence of chronic appendicitis, advantage is usually taken of a roentgen ray study.

This method of investigation is, however, so extremely delicate that many unsuspected findings, such as slight delay in emptying, varying shapes and obliteration of the lumen are frequently noted, which in themselves have but slight significance. The most constant x-ray findings of chronic appendicitis are tenderness over the region of the appendix, frequent changes in shape, abnormal and fixed position. The tenderness which is produced over the visualized appendix when moved under the palpating hand is of considerable value, being far more important than the tenderness ordinarily noted over McBurney's point when palpating the abdomen. This sign is often present during the recurrent attacks but usually disappears in the interval. Changes in shape of the appendix due to kinking and fixation from adhesions which are usually classified as important roentgenological findings may, however, be of but slight clinical significance. Other remaining signs are of even less importance. Of these, attention must be directed to abnormal filling. There is as yet so marked a disagreement as to the significance of filling or nonfilling of the appendix, that this sign must be at present entirely disregarded.

Brown and Gaither⁴ call attention in the visualization of the appendix to its changes in shape as well as to the pain produced on palpation under fluoroscopic investigation as important evidences of chronic appendicitis. They consider these findings, when taken into consideration with the clinical history, as well as subjective and objective findings, of the greatest value in diagnosis.

Of indirect signs, disturbances of the ileum and cecum must be considered. Ileal and cecal stasis may be caused by adhesions arising from the appendix, but according to White,⁵ are not always due to this condition and may occur also as the result of atony and ptosis of the bowel. Pyloric spasm is frequently noted, but is of slight diagnostic importance. The roentgen ray records, therefore, many changes which are in themselves of slight clinical significance. These signs can therefore be utilized only as confirmatory evidence of chronic appendicitis and must be considered of value only when taken into consideration with the clinical manifestations of the disease. However, the x-ray may be of considerable aid in diagnosis in eliminating the presence of other affections.

Further confusion has arisen in diagnosis due to pathological studies of the appendix itself. No less an observer than Aschoff has directed attention to the occurrence of chronic inflammatory changes in the appendix in three-quarters to four-fifths of all individuals in the sixth and seventh decades of life. On the other hand, these findings, valuable as they may be, are in themselves, not of sufficient evidence to indicate that all such lesions are necessarily associated with symptoms. As a matter of fact, an individual may continue on throughout life with changes of this type without manifesting any evidence of the slightest discomfort. Aschoff, as well as many others, maintains that all cases of chronic appendicitis occur as the result of former acute attacks, though it is difficult to obtain a history of this

condition in many instances. A patient may have forgotten a previous attack, for many of these occur during childhood, and are overlooked or may have been of so mild a type as to escape detection. On the other hand, Deaver is firmly convinced, that not all chronic appendices are the result of previous acute disease, but may be due to a low-grade intestinal infection. According to our experience, one should hesitate in arriving at the diagnosis of this affection without a previous history of an acute or of recurrent attacks.

The clinical signs of chronic appendicitis are rarely distinctive. The pain and tenderness in the right lower quadrant may be due to other causes and in most instances localizing symptoms are absent. The gastric symptoms noted so frequently, such as loss of appetite, fullness, acidity, regurgitation, nausea and vomiting are due to pylorospasm and are not infrequently observed in other affections, as for instance, in gall bladder disease, and are by no means characteristic of chronic appendiceal disease. On the other hand symptoms apparently caused by chronic changes in the appendix are in many instances not produced by this condition itself, but are often the result of a general constitutional asthenia not uncommonly associated with viscerop-tosis, a mobile right colon, movable cecum, mucous colitis, or ileal stasis. At times they may even be due to peptic ulcer or gall bladder disease. Case⁶ has shown from a study of his patients, who continued to complain of right lower quadrant pain following appendectomy, that in a large number of these cases, the etiology was found to be in the pelvic colon and rectum.

Pelvic tumors, carcinoma, diverticulitis, hemorrhoids and enterospasm constituted the most common causes in his cases.

Carnett,⁷ has more recently demonstrated that patients affected with so-called chronic appendicitis are usually not the subjects of this condition, but of more or less generalized disturbances involving the digestive tract, as well as the abdominal wall. According to him, this affection is most commonly observed in constitutionally predisposed individuals and occurs most frequently in the asthenic or viscerop-totic neurotic type. It is on this account, that removal of the so-called chronic appendix is often ineffective in affording relief from the symptoms.

According to Carnett, the most frequent cause of pain and tenderness in the right lower quadrant of the abdomen is not to be found in the abdomen itself, but in the abdominal wall. It is due most frequently according to him, to neuralgia and less often to chronic strain of the lumbar spine and sacro-iliac joints. The method suggested by Carnett of differentiating between intra-abdominal and parietal tenderness is based on palpation of the abdominal wall following alternate relaxation and contraction. "Tenderness which is elicited over relaxed muscles may be either parietal or intra-abdominal in origin. Tenderness present with relaxed muscles and absent with tensed muscles is due to a subparietal lesion, and its cause should be sought inside the abdomen. Tenderness which is found both when the muscles are relaxed and when they are voluntarily tensed is due to an anterior

parietal lesion and its cause should be sought outside the abdominal cavity."

Carnett demonstrates the parietal location of the pain by determining tenderness "(1) by pinching abdominal skin and fat; (2) on finger-end poking of the abdominal wall, while the patient holds his abdominal muscles tense either by forcible contraction of the diaphragm or by raising and holding his heels above the bed with knees extended; (3) on making pressure over intercostal nerve trunks, and (4) on pinching or exciting finger-end pressure over Poupart's ligament and over the upper posterior buttock region on the right side." In order to obtain the best results, Carnett advises that these tests be carried out with considerable force. Since we have been utilizing the method of examination as advised by Carnett, it is surprising to note, how many suspected cases of so-called chronic appendicitis are found actually to be due to extra-visceral disease. In his studies Carnett rejects completely the theory of Head, Mackenzie and others of the visceroparietal reflex which, according to him, has resulted in numerous errors in diagnosis and ineffective operations.

It is evident, that the diagnosis of so-called chronic appendicitis is fraught with considerable difficulty and should be arrived at only following a careful intensive study. It is also doubtful whether this condition can actually occur except when preceded by an acute attack.

Inasmuch as the only definite direct evidence of chronic appendicitis from a clinical standpoint is in the complete relief afforded following the therapeutic test—appendectomy, it becomes a

matter of extreme difficulty to estimate the actual incidence of this affection. According to our observations, which are largely in accord with those of Bettman,⁸ this must be far less than has ordinarily been held.

On the other hand, however, Deaver² maintains that chronic appendicitis is just as much a distinct clinical entity as chronic peptic ulcer or chronic cholecystitis. Inasmuch as it occurs associated with practically all forms of abdominal lesions, as for instance, chronic cholecystitis and chronic peptic ulcer, it must be regarded, according to him, as a factor of importance in the etiology of these affections. It is possible, that it is the original focus from which the infection extends. The fact that all patients who are operated on for chronic appendicitis are not relieved of all of their symptoms, by no means proves, according to Deaver, that no such entity exists. He is so strongly impressed with the necessity of removing every chronically diseased appendix or even a suspected one, that he considers it a grave error to expose the patient to the unjustifiable risk of not operating. For, according to him, even though the symptoms of which the patient complains are not overcome by this procedure, he is assured against future attacks as well as of complications.

In summing up the results of these observations, it is quite evident that conflicting views are still held regarding the clinical significance of so-called chronic appendicitis. While on the one hand, some maintain that this condition cannot be regarded as a definite clinical entity, others hold quite as firmly the contrary view. When one contem-

plates the many instances in which so-called chronic appendices have been removed without affording even the slightest relief on the one hand, and many others in which symptoms have occurred for years followed by almost immediate as well as permanent relief by this procedure on the other, the cause of the conflicting views concerning the significance of this condition becomes apparent. It is quite evident, therefore, that it is impossible to draw general conclusions, but that each case must be considered individually and only following prolonged and most careful study can final conclusions be arrived at leading to the proper method of procedure to be undertaken.

Finally, it must be held in mind that distress in the right lower quadrant alone is in itself by no means sufficient evidence as an indication for operation, and that unless there is a direct history of preceding acute attacks, doubt as to diagnosis must be maintained unless the other factors present point overwhelmingly in favor of this procedure. In a study of 100 cases in which appendectomies had been performed for so-called chronic appendicitis with unsuccessful results, the following diagnoses were finally established:

	No. of Cases
Peptic Ulcer	24
Cholecystitis and Cholelithiasis	21
Renal and Ureteral Disease	4
Pelvic Disease	2
Colitis	11
Neuralgia of the Abdominal Wall	14
Carcinoma of the Cecum	2
Tuberculosis of the Cecum	1
Abdominal Adhesions	19
Hernia	—
Total	100

The following brief case reports may be of interest as indicating mistaken diagnosis as to so-called chronic appendicitis.

Case 1: Male, aged 27; digestive disturbance for years with abdominal colic; right lower quadrant discomfort and tenderness, diagnosis of chronic appendicitis; appendectomy performed; no relief; finally, complete recovery after treatment for mucous colitis, which evidently had been present for years.

Case 2: Female, aged 39; attacks of right-sided abdominal discomfort for years, beginning after birth of first child and occurring at irregular intervals; no discomfort or indigestion during intervals, tenderness in lower right abdomen; diagnosis of chronic appendicitis, McBurney incision; Chronic appendix removed; return of discomfort; three months' pain, gradually more violent, extending into upper right quadrant; diagnosis cholelithiasis; second operation; gall bladder removed filled with stones; complete recovery.

Case 3: Male, aged 25 years; indigestion for years; discomfort several hours after meals, usually relieved by food and alkalies; acid eructations; lower right discomfort and tenderness; diagnosis of chronic appendicitis with reflex stomach disturbance. Operation: appendectomy; relief for one year; return of symptoms; more intense; gastric hemorrhage; tarry stools; x-ray confirmed diagnosis of pyloric ulcer; medical treatment; complete recovery.

Case 4: Male, aged 56, frequent attacks of lower right-sided pains for years; always some discomfort in this region; tenderness in the lower right quadrant; slight urinary discomfort; urine found normal; operation, chronic appendix removed; no relief; severe attacks of pain in six months; bloody urine; cystoscopic examination revealed ureteral stone near bladder; removed intravesically; complete recovery.

Case 5: Male, aged 44; right-sided pain for years with tenderness in that region; flatulency; eructations, fullness and pain following meals; relief in the recumbent posture; diagnosis, chronic appendicitis; appen-

dectomy; no relief; small epigastric hernia discovered after years; second operation; repair of hernia; complete relief.

On the other hand the following cases illustrate the great value of appendectomy in certain instances of chronic appendicitis.

Case 1. Male, aged 19, discomfort in lower right quadrant of a mild type for years; indigestion with pressure, fullness following meals; eructations, flatulency, occasional nausea, loss of flesh; loss of appetite; weak, nervous; unable to work; tenderness constantly in right lower quadrant; no definite history of former acute attacks; appendectomy; entire relief of symptoms, gradual recovery from weakness; gain of 20 pounds after three months; complete and lasting recovery.

Case 2: Female, aged 31; lower right quadrant pain for years with tenderness in this area; movable right kidney; pain more intense at menstrual periods, occasionally pain violent, requiring morphia for relief; various diagnoses made; ovarian disease; ureteral stricture; renal colic; many ureteral dilatations without relief; finally appendectomy performed; a chronic appendix removed, complete restoration of health.

Case 3: Male, aged 51; affected with lower right-sided pain for years; never free from discomfort; no history of acute or recurrent attacks; tenderness over McBurney's point; appendectomy advised; unwilling to submit to procedure; sudden violent fulminating attack after 5 years; immediate operation; appendix removed revealing evidence of chronic inflammatory changes and gangrenous tip; many adhesions; stormy recovery; complete relief.

Case 4: Female, aged 26; indigestion for years; pain in stomach occurring two hours following meals; relieved by food and alkalis; acid eructations; slight tender epigastric area, occasional discomfort and tenderness in the lower right quadrant; test meal revealed hyperchlorhydria; x-ray showed small defect at pylorus and lower right quadrant adhesions; thorough ulcer treatment instituted; no relief; discomfort

in lower right abdomen more intense; tenderness in this region; appendectomy performed; curled up appendix removed contained concretions; complete recovery both from local and dyspeptic symptoms.

Case 5: Female, aged 41; discomfort in right side for many years; occasionally colicky in type; tenderness in this region; never fever; considerable mucus discharged in stools in the form of shreds and bands; severe constipation; diagnosis mucous colitis; various treatment instituted; irrigations of many varieties; temporary relief only; tenderness in right side more intense; appendectomy advised; a chronic appendix with many adhesions removed; complete recovery from discomfort; no further evidence of mucous colitis.

CONCLUSIONS

From a careful review of the literature as well as from our observations extending over a large series of cases the following conclusions seem justified.

1. Chronic appendicitis when considered purely from a clinical standpoint is not as is usually held. That it does, however, occur is evidenced by the complete and permanent relief at times afforded by means of appendectomy.

2. The symptoms produced by so-called chronic appendicitis usually occur as (1) the result of either widespread disturbance involving other abdominal organs not limited to the appendix itself or as (2) forms of neuralgia occurring in the abdominal wall. The method of examination as advised by Carnett should always be followed in differentiating these conditions.

3. The roentgen ray signs are usually misleading and difficult of interpretation, and can therefore be regarded as of minor significance only.

4. Individualization is of paramount importance. The diagnosis should

never be made except following prolonged intensive study of the patient and should always be regarded with

suspicion unless a history of preceding acute or recurring attacks can be elicited.

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Early Diagnosis of Neoplasms of the Digestive Tract*

By THOMAS R. BROWN, M.D., F.A.C.P., *Baltimore, Maryland*

I THINK we will all agree that the final aim of Medicine is the prevention or cure of disease—that our studies in gross and microscopic pathology, in bacteriology and in the ever-widening fields of biochemistry and biophysics have this as their ultimate goal. The age of therapeutic nihilism is past; we are no longer satisfied with etiology, pathology and diagnosis; therapy, be it psychical or physical, dietetic, pharmaceutical or surgical, is at last the *ultima thule* for which we are striving.

Perhaps there is no group of diseases in which therapy has been so bitterly disappointing as the malignant new growths of the digestive tract—for in this field relatively early diagnosis is essential if there is to be any chance of success of surgical removal—our *only* effective means of treatment at the present writing and it was but a few years ago that one of the masters in gastro-enterology, Boas, said, "No one can make an early diagnosis of digestive cancer—one must be satisfied with a correct *late* diagnosis."

In a sense this is true for there must be a period of latency, symptom-free, in the evolution of every neoplasm

when diagnosis is impossible except by the veriest accident. On the other hand, the more we have studied these cases—and they have been the cause of our intensive study ever since the founding of our Clinic eighteen years ago—the more we are convinced that a relatively early diagnosis is possible in many cases, antedating by months, and sometimes by a year or more, the time when the diagnosis had been finally made, and that in many cases it was this fatal delay that spelled the difference between hopelessness and potential success.

Cancer is met with more frequently in the digestive tract than anywhere else in the body; it is definitely on the increase, an increase not to be explained by better methods of diagnosis or by the steady increase of the average age of man, but a true increase apparently due in some way to the accidents and incidents peculiar to an increasingly complex civilization. Is it due to new forms of trauma? Is it in any way due to increasing mental and nervous strain? Does our modern diet play a rôle? No one can prove that it does and yet Hoffman has found marked infrequency of digestive cancer among the primitive tribes of South America; McGarrison meets with practically no cases in the 400 to 500

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abdominal operations that he has performed yearly on the natives of the hills of Northern India; and Lane is firmly convinced that excessive consumption of meat, especially pork, and lessening intake of raw and rough foods with its inevitable lessening of motor activity of the large intestine, play a major rôle in the etiology of neoplasms of the digestive tract.

But to the vast majority of students in this field, no satisfactory explanation has been found for its cause or its increase. Why is it so much more prevalent in some countries than in others? Is it contagious? May there be a hereditary factor? The work of Wells and Slye on white mice suggests this possibility and recent statistical studies, notably those of Wassinck from Norway, are hard to interpret otherwise.

Again, there is considerable evidence that in other parts of the body trauma plays a causative rôle, as, for example, the neoplasm of cotton-spinners and chimney sweeps, of workers in certain aniline dyes and tar, those due to parasites such as *Bilharzia*, *Schistosoma* and the *Spiroptera neoplastica*, and the skin cancers after exposure to the x-rays. There is, however, no evidence that metabolic disturbances or lack of vitamins play any part in its etiology.

But none of these facts or factors are of any help to us in diagnosing digestive carcinomata and we must depend on other means of attack. We do not know its cause and therefore we have no means of preventing its development, and so our hope lies in a relatively early diagnosis and early and bold surgery.

Cancer of the *oesophagus* should be ideal for surgical treatment were it not for the great technical difficulties involved. Diagnosis is made early. Progressive difficulty of swallowing in the middle aged or old should always make us suspicious, while oesophagoscopy and x-ray studies will usually confirm the diagnosis. It must not be forgotten, however, that intermittent dysphagia such as is usually met with in oesophagospasm occasionally occurs in new growths as well and must be ruled out by similar methods and by other means, notably the much less degree of oesophageal dilatation in the case of cancer.

These cases give early symptoms, they develop slowly and metastasize late; they are simply waiting for a technique for successful removal. Robert Miller has performed successful oesophagectomies on dogs, but in the cases in which he and others have operated on human beings, all have succumbed to mediastinal infection. And yet, I know the time of their successful removal lies in the very near future. One has but to remember the almost insuperable technical difficulties that have been so brilliantly overcome in brain and thoracic surgery, fields that seemed equally hopeless but a short time ago, to feel that it is but a question of time before the skill and persistence of our surgical brethren will conquer this field as well. Until then, palliative treatment is all that we can employ, for radium and x-ray therapy and treatment with colloid metals have all proven woefully disappointing.

In the case of new growths of the *stomach* the problem is essentially different; removal, successful complete

removal is possible, but to make this possibility a reality, early diagnosis is essential. In making this early or, if you will, relatively early diagnosis—for the life span of gastric cancer is possibly *not* the usually accepted one-half to one and a half years but from one to three or four years, and what we regard as the first act is in reality the second or third—the history of the case is of more importance than any or all other factors, for after all, unless we suspect, we will not thoroughly investigate.

In an analysis of all our cases of gastric carcinoma for a period of fifteen years, less than 5 per cent gave a previous history suggesting ulcer, about 10 per cent had had previous vague gastric symptoms, 85 per cent had had absolutely *no* previous digestive symptoms and it must be this fact—this development *de novo* of digestive symptoms, usually but not always in persons of middle or later life, coming on with no obvious cause and not yielding to symptomatic treatment—that at the present writing at least is our one most valuable means of suspecting or diagnosing gastric cancer and in making us pursue those intensive studies—gastric contents for dropping acid or achlorhydria with special studies as to the soluble protein contents, stool for occult blood, radiography and, especially, repeated and careful fluoroscopy—which in most cases should give us our diagnosis and tell us whether we are dealing with cancer or with one of those conditions with which it is most likely to be confused, chronic biliary tract disease, gastric lues, atypical ulcer or pernicious anemia. The tragedy of gastric can-

cer is that its seat of election is not pylorus or cardia, but in the vast majority of cases the lesser curvature, the silent area, where it may grow for a surprising length of time and reach a very considerable size before producing symptoms sufficient to make the patient consult his physician. These symptoms are in no wise characteristic or even suggestive in themselves—usually a slight loss of appetite, some discomfort or fulness, sometimes pain, occasionally slight nausea, in other words those of an ordinary banal dyspepsia—but, and this is the crux of the matter, appearing without cause and *not* disappearing under appropriate symptomatic treatment.

In that very small group of ulcers developing into cancer, 5 per cent in our series, only 1.1 per cent and 3.4 per cent in the last two large German series, a *lessening* of appetite, a dropping of acid, persistence of occult blood in the stool, should arouse our suspicion.

It is quite impossible to tell from the size of the growth or the length of the history whether it is operable. Some metastasize early and these are obviously hopeless, a few grow to a considerable size and still remain a local problem only, but obviously in all cases the chance of success depends upon the earliness of diagnosis. I am more and more convinced that it is wiser to operate on a well-grounded suspicion than to wait for a diagnosis beyond criticism. At present we have had more than 50 cases in which surgery seemed justifiable and in about one-half of these the results were promising, one case living fifteen years, several more than ten years and the

rest from two to five years after the operation. We have had no success with any other form of therapy, radium, x-ray, colloid lead, colloid selenium. Incidentally, none of our cases, however extensive the gastric resection, has developed a blood picture suggesting that of pernicious anemia, these results agreeing with those of Henschel of Basle in 77 cases of subtotal gastrectomy.

In new growths of the *small intestine* it is practically impossible to make an early diagnosis, for with the liquid contents and its rapid passage, signs of obstruction must come late, and even then are difficult to recognize—pain, gaseous distention, delay of the barium column, distension of the gut with gas above a definite point as seen in the fluoroscope.

Fortunately the condition is extremely rare—Rankin and Mayo had only 31 cases from 1919 to 1929 at the Mayo Clinic, while in this same ten year period, there were 2,775 cases of cancer of the large bowel and 2,646 of the stomach. The relative lateness of the diagnosis was shown by the fact that whatever the operation, no patient lived more than three years and the average duration of life after the operation was less than one year.

On the other hand, in the case of cancer of the *large bowel*, we have our best opportunity of combining early diagnosis and potential surgical cure, for here we have semi-solid intestinal contents, a much slower passage, a short well defined tube and obviously much earlier and more easily localized obstructive or ulcerative phenomena, while our means of confirming the diagnosis are much more exact.

And yet, a few years ago, I had 9 consecutive cases incorrectly diagnosed, cases with symptoms lasting from six to eighteen months and wrongly diagnosed as mucous colitis, intestinal neurosis, chronic constipation or gastric dyspepsia, for, just as in rare cases of gastric cancer, the symptoms may be entirely intestinal, so in a few cases of intestinal neoplasm, the predominant symptoms are gastric. But, in every one of these cases, malignancy should have been suspected almost from the very first for in every case the symptoms represented various manifestations of large intestinal obstruction, progressive or intermittent, and in every case the symptoms came out of a clear sky with *no* previous intestinal symptoms; in every case the diagnosis could have been anticipated by many months if, and this is essential, the possible cause had been suspected and simple confirmatory methods used—careful abdominal palpation, in a hot bath if the wall is rigid, study of the stool for occult blood and pus, digital rectal and sigmoidoscopic and proctoscopic examinations and very careful X-ray studies, especially fluoroscopy with the barium enema and ruling out by the proper methods tuberculosis, lues, ulcerative colitis, polyp and post-operative adhesions. A persistent filling defect, persistent occult blood in the stool, although obviously it is better, although not often possible, to make the diagnosis before ulceration is present, sometimes a palpable tumor, these with the local and general symptoms, must and usually can give us our correct diagnosis.

From our intensive clinical studies in this field for nearly twenty years, we are convinced:

First, that there is no test, no laboratory technical method, that is as valuable in diagnosing gastro-intestinal neoplasms as a careful analysis of the history of the case—discarding no symptom because it may seem insignificant. It is upon the art, not the science of medicine, that we must lean, that nice balancing of the facts, that keen judgment in their interpretation, that careful weighing of cause and effect, in other words, those highly developed qualities that spell the real clinician. With this as our foundation, we can make a surprising number of relatively early diagnosis if we utilize in addition all the other means at our command, especially careful palpation, the study of gastric contents and stool, the use of instruments for direct study and the x-ray, especially fluoroscopy.

Second, at the present writing, surgery, radical surgery, offers our *only* hope of cure, but to make this possible or probable early diagnosis is essential. It is far wiser to explore on a well grounded suspicion than to wait for an absolute diagnosis when all too often metastasis and extension of the growth makes complete surgical removal impossible.

But after all, it is not upon the shoulders of the consultant, the specialist or the surgeon that the responsibility for making the early diagnosis of digestive neoplasms lies, but upon those of that great body of internists and general practitioners to whom the patients come first with their symptoms—symptoms rarely characteristic, often very mild, usually simulating simple functional disturbances in their early phases—but in the majority of cases having one quality in common, one motif that runs through this dance of death, that there had been no history of previous digestive disturbances, that they appeared without apparent cause, that they did not yield quickly to symptomatic treatment. It is this development *de novo*, this progression irrespective of treatment that should arouse our suspicion as to possible malignancy and that should make us utilize every scientific method at our command to confirm or refute this possibility. This, and this only, seems to me at the present writing to be our only possibility of making an early diagnosis, and with this early diagnosis or probability, of materially diminishing the appalling mortality and of appreciably increasing our percentage of permanent cures by the only successful mode of treatment—early, bold, radical surgery.

Studies on the Mechanism of the Pain of Peptic Ulcer*†

By FRED M. SMITH, M.D., F.A.C.P., and W. D. PAUL, M.D., *Iowa City, Iowa*

VARIOUS explanations have been given for the pain of peptic ulcer. In general, however, there are two prevailing conceptions. One is primarily concerned with the irritating action of the hydrochloric acid of the gastric juice on the exposed nerve endings in the ulcer. The other places the emphasis on the altered motor function as represented by spasm, particularly of the pylorus or pyloric sphincter, hyperperistalsis or a combination of these factors producing increased gastric tension.

Talma¹ was one of the first to study the mechanism of gastric pain by the introduction of acid into the stomach. Bönninger,² Heinecke and von Selms³ reported the reproduction of the pain of gastric ulcer by the administration of varying strengths of hydrochloric acid, whereas, in normal individuals, the results were negative. Sippy,⁴ later championed the acid theory of the production of the pain in peptic ulcer. He furthermore believed that the corrosive action of the acid interfered with the healing of the ulcer which

was the basis for the alkali therapy in his well known treatment.

Palmer⁵ has more recently investigated the influence of acid on the pain of peptic ulcer. He administered through a Rehfuess tube, 200 cc. of a 0.5 per cent hydrochloric acid. If the pain was not reproduced within thirty minutes, another 200 cc. was added. The same amount was occasionally administered the third time. The results are tabulated in three groups. The first is concerned with normal individuals in whom the results were uniformly negative. The second pertains to the study of twenty-five patients with ulcer in whom the typical distress was not induced. Only four of these were said to be in a "distress period." He defines a "distress free period" as one in which spontaneous pain was not experienced during the twenty-four hours preceding the test. The last group deals with eighty-four cases in which the pain was induced by the administration of the acid. In this series the distress was reproduced in 324 of the 404 attempts. Seventy of the eighty failures occurred during the distress free period. It is evident, from the above results, that unless the pain is occurring at frequent intervals, it is not possible to induce it by the

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repeated administration of 200 cc. of 0.5 per cent hydrochloric acid.

The roentgenological examination in peptic ulcer directed attention to the possibility of spasm and hyperperistalsis contributing to the production of the pain. Hurst⁶ was one of the first to emphasize the importance of increased gastric tension in the production of the distress. He concluded, from an experimental and clinical study, that the mucous membrane of the stomach is insensitive to stimulation from dilute hydrochloric acid and dilute organic acids. He, furthermore stated that the surface of a gastric or duodenal ulcer is no more sensitive to tactile, thermal and chemical stimulation than the intact mucous membrane. This investigator⁷ has more recently described in detail his conception of the mechanism of the pain in peptic ulcer. He first considers duodenal ulcer and attributes the distress to an increase in the intragastric tension of the pyloric vestibule. In brief, he explains the increased tension on the basis of an achalasia or a spasm of the pyloric sphincter interfering with the expression of the gastric contents into the duodenum and the approach of an active peristaltic wave which is sufficiently powerful to obliterate the lumen of the pyloric section. He considers that the mechanism in gastric ulcer is the same as that in duodenal ulcer. In the gastric ulcer, located some distance from the pylorus, the function of the pyloric sphincter may not be disturbed. In these instances, however, the author points out that a spasm of the circular muscle of the segment of the stomach corresponding to the ulcer may be of sufficient in-

tensity to produce pain when approached by an active peristaltic wave. Ryle,⁸ in a consideration of the nature of visceral pain, has stressed the importance of increased tension in the wall of the viscus.

The work of Carlson⁹ on the hunger contraction stimulated an investigation of this feature in connection with the pain of peptic ulcer. Ginsburg, Tumpowsky and Hamburger,¹⁰ Carlson¹¹ and Hardt,^{12, 13} employing the balloon method, observed that the pain in gastric and duodenal ulcer was synchronous with the occurrence of strong contraction waves. These contraction waves corresponded with the hunger contraction waves described by Carlson in the normal individual. These investigators were not able to correlate the appearance of the pain with the gastric acidity. Hardt¹³ reports the study of a patient with gastric ulcer in whom no free acid was demonstrated by repeated aspiration of the gastric contents. In this patient, the typical pain, in almost every instance, occurred with the registration of a peristaltic wave. The results of Ortmayer¹⁴ and Homans¹⁵ neither confirmed nor disproved the above observation. In their work, however, the balloon was probably well above the most active portion of the stomach.

Poulton¹⁶ reports the reproduction of the typical distress in patients with peptic ulcer by the introduction of air into the stomach. Immediate relief was obtained by aspirating the air. In this connection, the observations of MacLeod¹⁷ are of interest. An Einhorn tube was introduced into the first portion of the duodenum in twenty cases of duodenal ulcer. The position

of the tube was verified by fluoroscopic examination. Air was administered and the typical pain reproduced. In each instance, the diagnosis was confirmed by operation. Poulton,¹⁸ later studied visceral pain by means of a balloon in the lower end of the esophagus. He concluded that pain may be induced by increased tone alone, but pointed out that the latter feature was usually accompanied by a hyperperistalsis.

Reynolds and McClure¹⁹ investigated, by fluoroscopic method, the relation of the gastric motor phenomena to the pain of peptic ulcer. They were invariably able to demonstrate these features during periods of distress. A similar method was employed by Wilson²⁰ in the study of the pain of duodenal ulcer. In thirteen of sixteen cases, the pain terminated abruptly upon filling the duodenal cap by manual pressure.

In a previous investigation,²¹ the recurring localized epigastric distress associated with irritable colon and chronic appendicitis was demonstrated to be gastric in origin. This distress, which may have all the characteristic features of that of peptic ulcer, was accompanied by an increase in tone and an active peristalsis of the pyloric section of the stomach. These alterations in the gastric activity were induced by a reflex stimulation from the colon and appendix. They were abolished and the pain eliminated by the administration of atropine.

A reflex stimulation of the stomach from the colon was demonstrated in certain instances of peptic ulcer. This was accompanied by an epigastric distress which was said to be identical

to that attributed to the ulcer. The gastric alterations were similar to those associated with irritable colon and chronic appendicitis, and the pain occurred under the same condition.

The above investigation led to the study of the changes in tone and the peristaltic activity of the pyloric region of the stomach in peptic ulcer. It was believed that a more accurate knowledge of the altered gastric phenomena in this particular section of the stomach would contribute to the explanation of the pain, and possibly point to a more satisfactory method of treatment. The present report is concerned with the mechanism of the pain.

METHOD

The method was similar to that employed in the former investigation. A small rubber balloon was passed into the pyloric section of the stomach and anchored in this location by an *Einhorn* bucket. This balloon was connected through a water and air system with a bellows tambour which recorded the gastric activity on a kymograph. A *Rehfuss* tube was usually introduced into the stomach with the balloon and acid determinations made during the registration of the gastric activity.

FINDINGS

The records taken during the active stage of ulcer showed recurring periods of increased gastric activity in which an increase in the tone and spasm of the pyloric section were prominent features. The record in Figure 1 was taken of a patient with gastric ulcer soon after admission to the hospital. Early in the record, there is a violent tone change with the on-

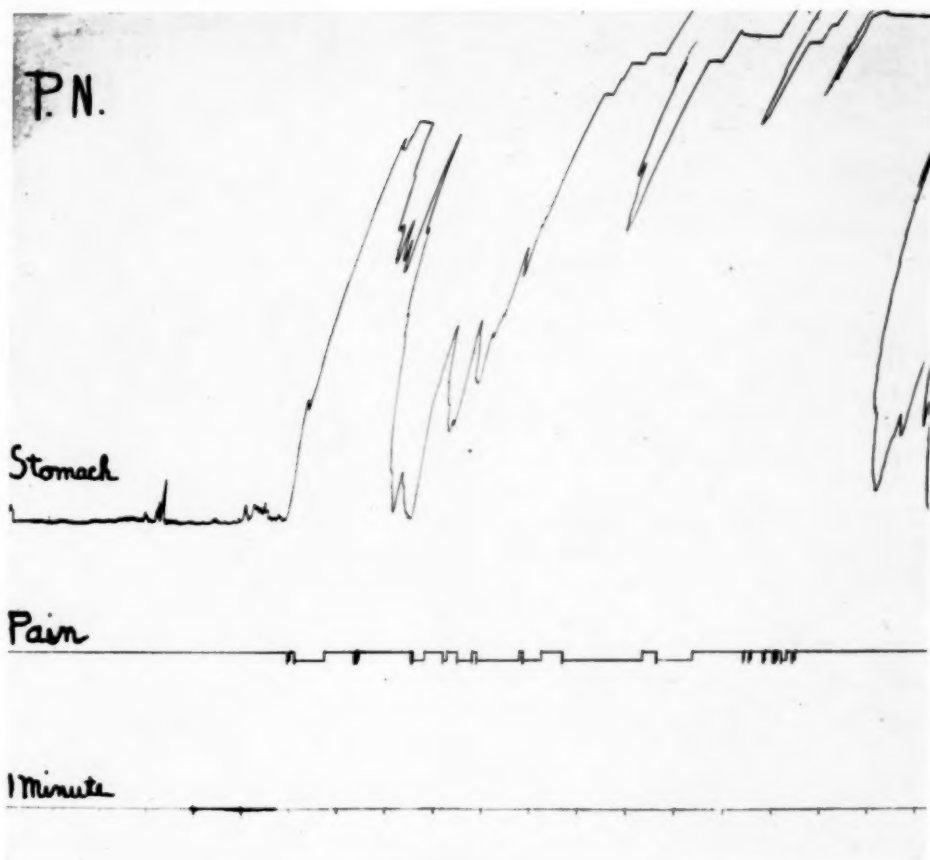


FIG. 1

set of an active peristalsis. This was accompanied by the onset of severe epigastric distress and marked rigidity of the upper abdomen. The pain finally became so intense that the operator was alarmed for fear that there might be a perforation. Following the withdrawal of the balloon, however, there was immediate relief from the pain.

The record in Figure 2 represents a continuous registration of the gastric activity of a patient with duodenal ulcer from 9:30 A.M. to 1 P.M. There

were three periods of active peristalsis which were accompanied by a marked increase in tone. Each of these lasted about thirty minutes and two were accompanied by pain. The first occurred between 9:30 and 10:30 A.M. It terminated abruptly and the patient went to sleep. He was awakened about 11 A.M. soon after the onset of the second paroxysm, by a sharp pain. Following the termination of the second period of exaggerated gastric activity, which was similar to the first, the stomach was relatively inactive until

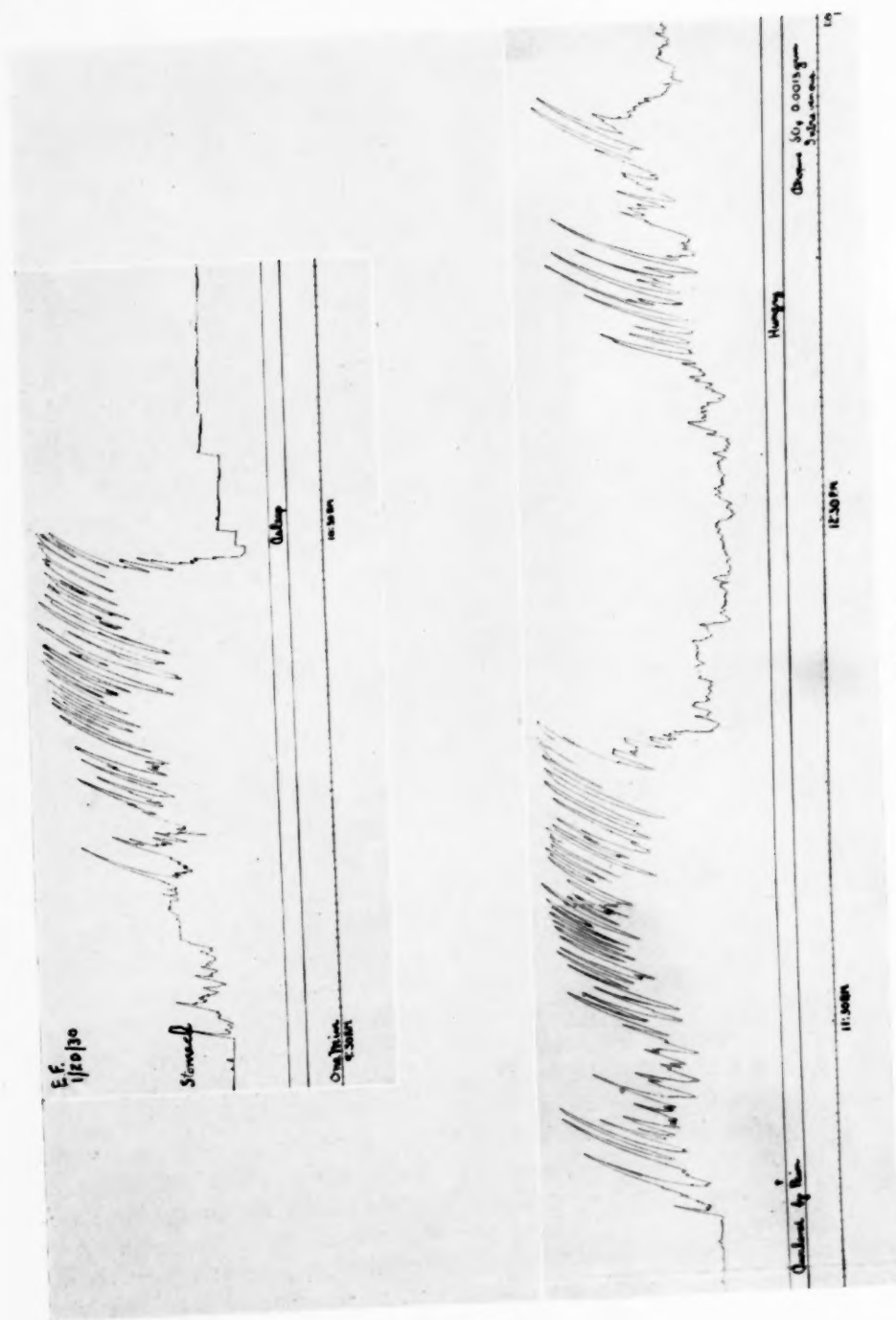


FIG. 2

about 12:30 P.M., when the patient began to feel hungry. The administration of atropine sulphate, 1/50 of a grain, intravenously, was followed by a prompt cessation of the peristalsis, a gradual reduction in the tone and complete relief from the distress for twenty-four hours.

The record in Figure 3 was taken of a patient with gastric ulcer after a few days rest in the hospital. The short paroxysm of increased tone and hyperperistalsis is of interest in that the patient was awakened by pain. This period of increased gastric activity subsided within a few minutes and the patient continued his sleep. The stomach was relatively quiet thereafter until the onset of hunger contractions about noon. While some of the hun-

gent, there was no distress, probably because of the absence of a significant increase in tone.

The findings in Figures 4 and 5 are included because of the similarity in the gastric alteration. It will be observed that each of these records shows two periods of increased gastric activity, accompanied by the typical distress. The second in each instance was precipitated by the introduction of air through a Rehfuß tube. The first paroxysm in Figure 4 terminated spontaneously. The others, in the order of their occurrence, subsided following the aspiration of air, belching and vomiting. These observations seem to indicate that the introduction of air is an effective means of stimulating the stomach. Furthermore, this induced stimulation may be suddenly

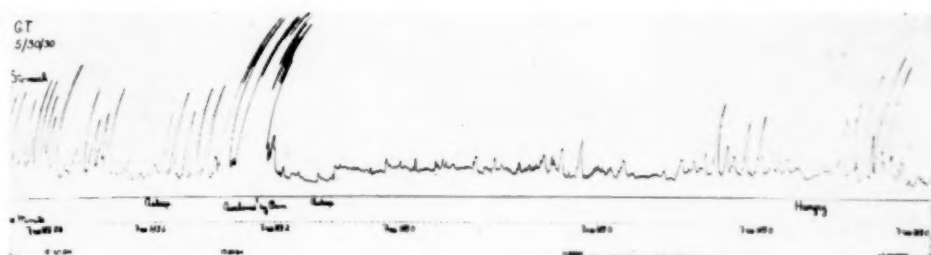


FIG. 3

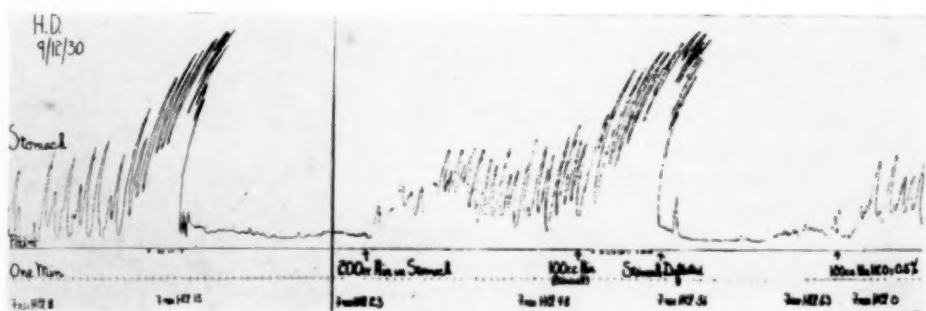


FIG. 4

terminated by aspirating air, belching, vomiting or probably by any procedure which reduces the intragastric tension.

The gastric curve shown in Figure 6 was obtained from a patient with duodenal ulcer who was experiencing some distress at the beginning of the observation. The free acidity at this time was 49. Shortly following the administration of the sodium bicarbonate, even though there was no free acid in the gastric contents, the stomach became more active. The pain was finally so intense that it was necessary

to hold the patient on the table while atropine was given intravenously. This was followed by a prompt reduction in the gastric activity and the disappearance of the distress.

This observation suggests that the pain may even be aggravated by the administration of sodium bicarbonate. It would seem that the carbon dioxide formed by the sodium bicarbonate was not permitted to escape, either through the cardiac or pyloric sphincter. The resulting increase in the intragastric tension along with the more active per-

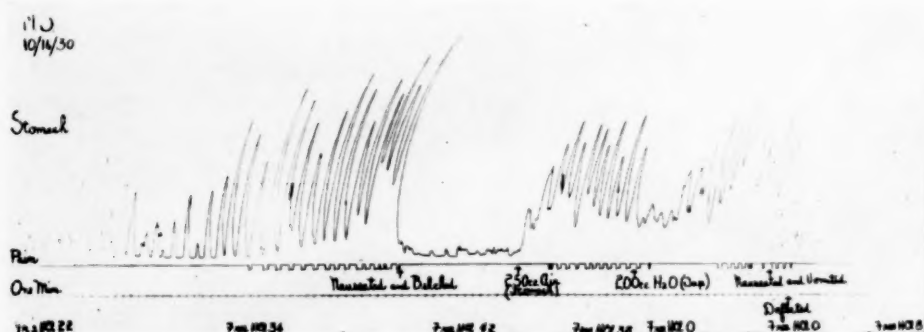


FIG. 5

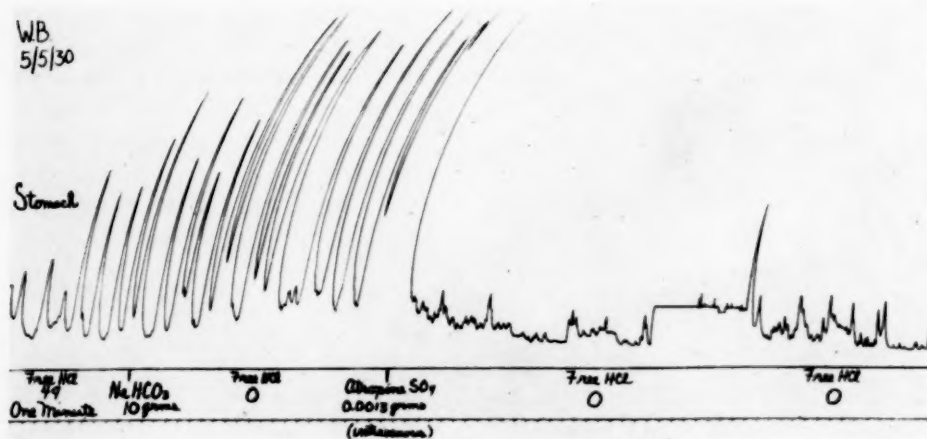


FIG. 6

istalsis intensified the distress. It is assumed that the sudden termination resulted from the escape of gas through the relaxation of the pyloric sphincter by the atropine.

COMMENT

In the above series of experiments, the gastric alterations were similar during periods of pain. These changes were characterized by an increase in tone and the onset of an active peristalsis. The pain in each instance corresponded with the passage of a peristaltic wave except in the more severe form when there was an apparent persistent spasm of the pylorus (Figure 1). These findings are in accord with the observations of Ginsburg, Tumpowsky and Hamburger, Carlson and Hardt. While a hyperperistalsis invariably accompanied a significant increase in tone, the latter feature was apparently fundamental to the production of the pain. It will be noted that the terminations of the paroxysm of increased gastric activity were likewise similar, regardless of the agent responsible. In some instances, the termination was spontaneous, while in others, it promptly followed belching, vomiting, the aspiration of air, or the administration of atropine. These observations support the contention of Hurst and Ryle, that the pain is primarily dependent on an increase in the intragastric tension. The roentgenological findings of Wilson, in the study of the pain of duodenal ulcer may be explained on this basis. It will be recalled that the pain terminated abruptly upon filling the duodenal cap by manual pressure. It might thus be argued that the pain was relieved by the re-

duction in the intragastric tension from expressing the gastric contents into the duodenum.

The significance of the observation of Poulton on the occurrence of typical ulcer pain following the introduction of air into the stomach is more apparent in view of our results. In the experiments in Figures 4 and 5, the paroxysms of increased gastric activity accompanied by pain were induced by the administration of air and terminated by the reduction in the intragastric tension. The experiment in Figure 6 is of particular interest in this connection. It would seem probable that the gas formed from the administration of the sodium bicarbonate was responsible for the increased gastric activity.

CONCLUSIONS

These findings are very similar to the gastric alteration associated with irritable colon and chronic appendicitis, and the pain occurred under the same condition. In the former study, it was not believed that the hydrochloric acid of the gastric contents was a factor in the production of the distress, and in the present investigation, there was no apparent correlation in these features. The pain in each may be relieved by various agents as alkalis, food, belching, aspiration of air, vomiting and the administration of atropine. It would thus seem that the production of the pain is primarily dependent on the altered motor phenomena and the associated increased gastric tension. We wish, however, to investigate other measures commonly employed in the treatment of the pain of peptic ulcer before coming to a more

definite conclusion. At the same time, the influence of the administration of a more detailed study will be made of hydrochloric acid.

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Rheumatoid Arthritis*

By RUSSELL L. CECIL, M.D., *New York City*

RHEUMATOID arthritis might well be called the step-child of Medicine for the reason that, like some other chronic diseases, it has always received scant attention from both investigators and practitioners. Osler himself is quoted as having remarked that when an arthritic patient walked into his consultation room, he always had a strong inclination to jump out the window. Most of the research work on arthritis has been spasmodic or accidental, and until recent times few practitioners have made a special study of the disease.

It is unfortunate that such a common malady should have received this neglect. Within the last few years, however, a noticeable change has taken place in the attitude of medical men toward rheumatic diseases, and because of this intensive study and research, definite knowledge is being gained concerning the various types of arthritis and the modes of treatment. For one thing we have learned to classify arthritic conditions into various groups. Both European and American students are agreed that most cases fall into one or the other of two main divisions, infectious or rheumatoid arthritis, and hypertrophic or osteoarthritis.

Osteoarthritis is something that all

of us achieve as the reward of old age, though it may appear in the early fifties, particularly in stout women who have just passed through menopause. There is no reason to believe that osteoarthritis is an infection; on the contrary, it appears to be a phase of senescence brought about by insufficient blood supply to the joint structures. The small capillaries become thickened and occluded, and as a result certain degenerative changes occur in the bone and cartilage. A classic example of osteoarthritis is furnished by the so-called Heberden's nodes on the distal phalangeal joints of the fingers.

Rheumatoid arthritis is a true inflammatory process characterized in the early stages by migratory pain and swelling in various joints and in the late stages by ankylosis and deformity. For twenty years rheumatoid arthritis has been looked upon by most students of the disease as a chronic infection, though the exact nature of the infection has not been disclosed. There are several features of the disease which strongly support the infectious theory: its almost constant association with foci of infection; the moderate fever and leukocytosis which occur in some cases; the loss of weight and secondary anemia; the complications such as iritis, pleuritis and pericarditis; and finally its similarity in the early stages to gonococcal arthritis and rheumatic fe-

*Presented before the Baltimore Meeting of The American College of Physicians, March 23rd, 1931.

ver all suggest an infectious origin. The pathological findings are also those of a chronic infection. The granulation tissue which develops in the joint cavity and which if not checked, eventually fuses the articular surfaces together, can hardly be imagined as being derived from any other source than a bacterial one. The adhesions which one sees in these joints differ in no respect from the adhesions in the peritoneal and pleural cavities resulting from bacterial infection.

Bacteriologists have made extensive efforts to solve the riddle of rheumatoid arthritis, but their results have been inconsistent and desultory. To be sure, some form of streptococcus has long been suspected of being the etiological agent, chiefly because streptococci are frequently present in the original foci of infection, but efforts to isolate streptococci from the blood and joints have been either entirely unsuccessful or only partially so

Moon and Edwards,¹ Richards,² Billings³ and his co-workers, and Hadjopoulos and Burbank⁴ have all reported the isolation of streptococci from the blood or joints or from both sources in a certain number of cases of rheumatoid arthritis, the percentage of positive cultures, however, being comparatively small. More recently Forkner, Shands and Poston⁵ have reported cultures from the joints in 63 cases of chronic infectious arthritis with the isolation of streptococci in 11, or 17 per cent, of the cases. In a series of papers published during the last two years from the medical department of Cornell University, the writer, in collaboration with Edith E. Nicholls and Wendell J. Stainsby,^{6, 7}

has described a method of culturing the blood and joints in rheumatoid arthritis and also in rheumatic fever, which has proven remarkably satisfactory in respect to the isolation of streptococci. The basis for successful cultivation of these streptococci appears to rest, first, on very carefully and specially prepared culture media, and second, on observation of these cultures over a period of two to four weeks of incubation. Altogether 154 cases of rheumatoid arthritis have been subjected to blood cultures by this method. Of these cases 49 were also subjected to joint cultures. Of the 154 patients who had blood cultures, 96 or 62.3 per cent, yielded a streptococcus. In several patients a streptococcus was obtained from the blood in two or even three successive cultures.

As a control on these findings, 104 individuals either normal or suffering from some condition other than rheumatoid arthritis, were subjected to blood cultures, the technic being similar in all respects to that used on patients with rheumatoid arthritis. Of these controls 20 were normal healthy individuals with no joint symptoms and no obvious foci of infection. The remainder of the control group were patients suffering from some disease. Of these 23 were middle-aged patients, who presented a typical picture of degenerative arthritis with hypertrophic changes in the bones. The blood cultures on all this group were sterile. The remaining 61 controls were patients suffering from various diseases, including infections of various kinds. Of these 61 patients, 4 showed streptococcus viridans in their blood cultures. The four positive controls pre-

sented certain features in common; three had active foci of infection of the type usually associated with arthritis, while the fourth was an acute respiratory infection. In this connection it is interesting to note that there have been several reports in the literature lately on isolation of streptococci from the bloodstream of patients with acute respiratory infections.

In 40 cases of rheumatoid arthritis cultures were made from one of the affected joints. In 33 cases (67.3 per cent) a short-chained streptococcus was recovered from the joint cultures. In 48 cases that were subjected to both blood cultures and joint cultures, 37 (77 per cent) showed a streptococcus in either the blood or the affected joint. Control joint cultures were made on 18 patients who were suffering from conditions other than rheumatoid arthritis. The joint cultures from these 18 controls all remained sterile.

Time does not permit a detailed description of these streptococci which have been recovered from the blood and joints of rheumatoid patients. Suffice to say that both cultural and immunological evidence supports the conclusion that they are atypical hemolytic streptococci. They possess a remarkable capacity, however, for losing their hemolytic quality when kept for some time on laboratory culture media. They are quite different in their cultural and biological characteristics from the streptococci which we recover from the blood and joints of patients with rheumatic fever. In the latter disease cultures have usually yielded green streptococci, which tend to fall into a number of biological groups.

Even more significant perhaps than the presence of streptococci in the

blood of rheumatoid patients are the specific streptococcal agglutinins which these patients show in their blood sera. These agglutinins have been recently described in a publication from our clinic, and their presence has already been corroborated by Dawson, Olmstead and Boots⁸ who, because of these agglutinins, advance the theory that rheumatoid arthritis is a streptococcus hemolyticus infection. They look upon the joint manifestations, however, as allergic or toxic in character. These streptococcal agglutinins are so definite in a high percentage of cases that they can be made of considerable practical value in the diagnosis of this form of arthritis. In perfectly typical cases, such a test is perhaps not necessary except where the titer of the agglutinins is to be followed as an index of treatment, but in very early cases or in mixed forms of arthritis, or particularly in obscure back conditions, the agglutination test has proved of great value in our arthritis clinic in the correct classification of cases. In routine clinic work we have largely abandoned blood and joint cultures because they are difficult and time-consuming, and prefer the agglutination reaction both for diagnosis and prognosis. As a rule the more advanced the arthritis, the more potent the agglutination reaction. The agglutinin titer in rheumatoid arthritis usually runs between 1:320 and 1:5120 or even higher. Every patient with arthritis now admitted to the Cornell Arthritis Clinic is subjected to an agglutination test and a sedimentation test. Both of these tests are extremely valuable in differential diagnosis and both are of value in guidance of therapy.

When arthritic strains of streptococci are injected intravenously into rabbits, a faithful reproduction of rheumatoid arthritis is produced in these animals. Streptococci are recovered from the blood and joints of the arthritic rabbits and their blood contains agglutinins similar in all respects to the agglutinins found in the blood of human patients. The problem of reproducing rheumatoid arthritis in animals is a large one and so far only the surface has been scratched in our work at Cornell. We hope to go into this problem more thoroughly in the future.

It is only fair in this connection to report that the results obtained from bacteriological study of rheumatoid arthritis in other clinics have not always been consistent with our own. Nye and Waxelbaum⁹ were unable to corroborate our results in either rheumatic fever or rheumatoid arthritis. Dawson, Olmstead and Boots¹⁰ have obtained only negative results from blood and joint cultures in rheumatoid arthritis. Margolis and Dorsey¹¹ of the Mayo Clinic have partially corroborated our findings in that in a total of 29 specimens of either bone or synovial membrane from patients with infectious arthritis, 6 yielded streptococci on culture, and 5 diphtheroid bacilli. The most complete corroboration of our findings has come from Gray and Gowen,¹² who have recently published their results on blood and joint cultures in rheumatoid arthritis. In a series of 37 cases of rheumatoid arthritis, a streptococcus of the arthritic type was recovered in 67.6 per cent of the cases, a proportion almost identical with that obtained by us. Gray and Gowen have also noted that the organism produced

partial hemolysis on blood agar. Swift¹³ at the Rockefeller Institute obtained streptococci in only a small percentage of his patients with rheumatic fever, but Dr. William H. Park¹⁴ and his co-workers in the research laboratories of the New York City Department of Health are recovering green streptococci from both the blood and joints in a very high percentage of rheumatic fever cases.

This inconsistency in results is of course disappointing, but I believe can be explained on the basis of some slight differences in culture media. That such differences do exist is proved by the fact that even when cultures of our streptococci are sent to some laboratories, the local bacteriologist is at times unable to cultivate the organism on his own culture media.

Some investigators who have not been successful in cultivating streptococci from the blood and joints of patients with rheumatoid arthritis and rheumatic fever have advanced the theory that the streptococci which we have recovered are not actually in the blood or joints, but are contaminations from the skin or air. This theory, however, is hardly valid because:

1. Streptococci are rarely encountered as contaminants in bacteriologic work. In our own laboratory we have repeatedly exposed plates for several hours at a time, but have never recovered streptococci from them.

2. If these streptococci were contaminants one would expect to find just as high an incidence of positive cultures in the controls as in the arthritic series. Such, however, was not the case.

3. In almost 50 per cent of the positive cultures, both blood culture flasks

yielded streptococci, a finding entirely inconsistent with the contamination theory.

4. The high titer of specific streptococcal agglutinins in the blood and joint fluids of arthritic patients speaks strongly for the presence of these streptococci in the tissues themselves and also for their pathogenic quality. The fact that the agglutinins tend to disappear as the patient recovers is also significant.

Perhaps the most important practical phase of the newer bacteriology of rheumatoid arthritis is its bearing on vaccine therapy. Vaccine therapy has no doubt been considerably abused in some quarters, and for this reason has come into disfavor with many physicians as a therapeutic agent. This applies to arthritis as well as to other acute and chronic infections. However, in allergic conditions such as bacterial asthma and certain skin conditions, vaccines have come to be a part of the standard treatment, and recently Swift has published favorable reports on the use of streptococcus vaccine in the treatment of rheumatic fever, in which allergy seems to play an important part.

We have presented evidence to show that rheumatoid arthritis is a chronic specific infection caused by a special strain of streptococcus hemolyticus. If further study confirms this theory, it is most natural that efforts toward the development of some form of specific therapy should be undertaken with this organism. During the past three years we have treated several hundred rheumatoid patients with a streptococcus vaccine prepared from our "typical strain." We hope some time in the near future to report in detail our

results with this form of therapy. At present I can do no more than give the impressions obtained from three years of experience with this agent. The vaccine was originally prepared in the usual manner, that is, by killing washed cultures at 60° C. and standardizing by the Wright method. More recently, however, the streptococci have been killed by formalin instead of by heat, and this method seems to have produced a vaccine of higher antigenic power. At present we are administering vaccine by both the subcutaneous and intravenous methods using doses of from 100,000,000 to 1,000,000,000 in the former, and from 100,000 to 1,000,000 in the latter. In both methods we try to avoid unpleasant reactions. The interval between injections is four to five days, occasionally a week. In trying to evaluate vaccine therapy in arthritis, one must take into consideration the part which improved personal hygiene and the removal of any foci of infection may play in a patient's recovery. Other forms of therapy, such as medication, physiotherapy, hydrotherapy, etc., must also be given some weight, but unfortunately, in our experience, this is not considerable.

The results which we have obtained with vaccine therapy in the treatment of rheumatoid arthritis may be divided roughly into three groups: 1. Patients who make complete recovery from all joint symptoms. These patients for the most part have had a mild form of arthritis, but some could be classified as moderately severe. 2. Patients who make considerable improvement, but eventually reach a stationary stage and do not recover completely. These are

usually patients who have had arthritis for several years, with well-marked joint symptoms. 3. Patients who show little or no effect from vaccine therapy. These are usually patients of long-standing, with well-marked or advanced joint symptoms. There are exceptions to all these groups. I can recall some early cases that have not responded to vaccine therapy, but on the other hand I can recall some almost hopeless patients who have made surprising improvement with practically no other treatment than rest and vaccine. In each of the three groups there have been many patients who, in addition to the vaccine treatment,

have had foci of infection removed; but there are many others whose treatment consisted of vaccines alone.

On the whole, we may say that after having started out with considerable misgivings as to the value of streptococcus vaccine in the treatment of this disease, we have been forced to take the opposite position, and we now consider streptococcus vaccine an important therapeutic agent in the treatment of rheumatoid arthritis. Just how much of the benefit obtained is referable to specific effect and how much to foreign protein effect is a problem which can be settled only by further study.

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A Diagnostic Triad in Syphilitic Aortitis*†

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IT is superfluous to discuss the importance of recognizing aortic syphilis early. The contrasting results in properly treated and untreated cases speak for themselves. As far as I know, a clean-cut symptom-picture by which this disease may be diagnosed, is still lacking. I shall attempt this task in the present communication.

The confusion in the past was due largely to two factors, the frequent association of this disease with aortic atherosclerosis, and the misinterpretation of the Wassermann reaction.

How often have we seen on examining an aorta at autopsy, atheromatous, calcified plaques with wrinkling of the intima and pink streaks in the depressions between the folds! The commonly accepted diagnostic criteria, consisting of a dilated aorta, a systolic aortic murmur and a ringing aortic second sound are frequently due to co-existing aortic sclerosis with or without hypertension, rather than aortic syphilis. I have observed narrow or normal aortas without the signs just enumerated, in well-defined syphilitic

mesaortitis, as the following case will show:

G. H., a 40 year old male, who denied venereal infection, consulted me on February 28, 1929, because of severe *angina* after effort, excitement or meals, during the past year. It was especially severe in cold weather or when his stomach was full. He had observed that eating rare beef was apt to be followed by anginal pains. In the past 6 months he experienced abdominal pain and bloating after meals and excessive flatus. When the latter was expelled, the *angina* lessened. He slept badly because of exciting dreams which in turn induced *angina*, dyspnea and an indescribable "fright" over the precordium. These exhausted him, so that he had to get out of bed and stand in order to relieve the *angina*. Digitalis aggravated the *angina*.

Physical examination was essentially negative; no aortic murmurs, nor accentuation of the A₂ over the aorta. Only in the supra-clavicular fossa (over the subclavian artery) was the A₂ intensified. B. P. 110/60; pulse varied from 54 to 64 and the heart sounds were feeble. E. K. G. Diphasic T in lead 1. *The width of the aorta was normal on x-ray (6 ft. plate).* Only a slight knuckling on the left border could be seen. The blood Wassermanns done with the usual technique using both alcohol and cholesterin antigens and the Kolmer modification were strongly positive; the Kahn test reacted similarly.

The other significant features in this case were the negative vagus (carotid sinus) reflex and the increased blood sedimentation reaction. These points will be elaborated later. Suffice it here to say that:

The carotid sinus reflex was negative on the left side and doubtful on the right.

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†Read before the Minneapolis Meeting of the American College of Physicians, February 14th, 1930.

CAROTID SINUS REFLEX

Pulse Beats per 10 second Period	Right side Left side	
	Right side	Left side
Before test	10	10
During test	8	10
After test	10	10

The blood sedimentation reaction with the Westergren method was 41 mm. per hour (normal 4-6 mm.) and 106 for 24 hours (normal 40-60) After 8½ months of treatment (bismuth, mercury, salvarsan, iodides) the sedimentation rate was reduced to 6 mm. per hour and 68 mm. per 24 hours. The Wassermann tests still showed a 3 plus reaction, but after a course of bismarsen, the Wassermann and Kahn tests became negative and all the clinical symptoms disappeared (October 1, 1930).

The Wassermann has at times misled me. *False positive reactions*, especially with cholesterin antigens, are not rare in cases of *aortic atheromatosis*. In such cases, a wide aorta, a bruit, or ringing A2 sound may easily be ascribed to luetic aortitis. The conversion of a positive into a negative complement-fixation test after provocative salvarsan injections, the correlation with other serological reactions (Kolmer method, alcoholic antigen, and Kahn test) will reduce this source of error. The following case will illustrate the point under discussion:

A. S. (case No. 236403), a man, 59 years old, came to the Medical Center complaining of recurrent anginal pains on exertion or after eating. He got no relief from nitroglycerin. Three months before he developed symptoms of acute obstruction of the left coronary artery. This was verified by the existence of a negative T wave in lead I and a notched R in all the leads of the electrocardiogram. X-ray disclosed calcification and knobbing of the aorta, and moderate cardiac (especially left ventricular) enlargement. The cardiothoracic ratio was 54%. The B. P. was low, 104/70, and the heart sounds were audible. Blood Wassermann on

December 11, 1929, showed a 3 plus reaction with the cholesterin antigen, negative with the alcoholic. The same result was obtained on repetition of the tests a week later. He was given 2 doses of neo-salvarsan (.3 Gm.) a week apart. On January 14 and 20 the Wassermann tests with both antigens gave a negative reaction. The Kahn test was also negative. This man was obviously suffering from coronary and aortic sclerosis, not due to syphilis.

On the other hand a person with a negative Wassermann and none of the conventional signs of aortic disease may have aortic lues. In such instances, repetition of the blood examination after provocative measures, spinal fluid examination, the therapeutic test and the clinical picture to be described in this paper, will generally settle the diagnosis.

T. D., (case No. 240534), an obese, ruddy, 65 year old man came to the Medical Center on January 16, 1930, complaining of anginal pain on exertion or after meals for the past 12 years. Of late these had become quite severe and at times were accompanied by typical "angor mortis." He had a wide tortuous aorta, 6.5 c.m. in diameter, moderate inaudible heart sounds with negative T waves in all leads of E.K.G., small pupils which reacted to light, normal tendon reflexes, and a negative Wassermann with both alcoholic extract and cholesterin antigens. Thirty-five years ago he had a chancre which was untreated. Despite the results of the Wassermann test, it seemed plausible that the man had latent syphilis with localization in the aorta. With this thought in mind, the patient was given a course of iodides. The Wassermann reaction (end of March, 1930) gave a 2 plus reaction with an alcoholic antigen.

Syphilitic mesaortitis has in many cases a characteristic symptom triad consisting of *angina pectoris*, a negative carotid sinus reflex, and a rapid blood sedimentation rate. A positive

Wassermann occurs in two-thirds of the cases of luetic aortitis and serves only as a confirmatory test. Dilatation of the aorta, insufficiency of the aortic valve, a murmur and a ringing A2 sound may, but need not, be present. It is most commonly a disease of the fifth decade of life. The following two cases are presented in order to emphasize the diagnostic triad.

K. R., a woman 45 years old, who had never born children but had one miscarriage, came on May 1, 1929, complaining of burning anginal pain during the past year. It radiated down the arms and to the teeth and came on especially on walking out of doors, uphill, or during cold weather. When she leaned forward, she experienced more pain in the sternum. The chest pain was compared to that of swallowing a hot potato. She had no knowledge of a luetic infection. A diagnosis of hypertension was made a year before.

The patient was obese (about 50 lbs. overweight) with a Corrigan pulse, 64 per minute; B. P. 185/70; hemoglobin 57 per cent and a normal urine. Over the cardiac base a to-and-fro murmur was heard, and the diastolic bruit was transmitted to the apex. The aorta was wide, and dynamic pulsations were seen on the fluoroscopic screen. The E. K. G. showed a left ventricular preponderance with no T wave changes.

The carotid sinus reflex was negative on both sides.

CAROTID SINUS REFLEX		
Pulse Beats per 10 second Period		
	Right side	Left side
Before test	11	11
During test	11	10
After test	11	11

The sedimentation rate was 53 mm. per hour, 124 mm. in 24 hours.

The Wassermann showed a 4 plus reaction with the various antigens and Kolmer technique.

Diagnosis: *Luetic mesaortitis complicated by aortic insufficiency.*

E. B., a 36 year old police officer, experienced for 1½ years angina on exertion or after meals. Amyl nitrite gave him immediate relief. His angina increased steadily despite the reduction of weight from 225 to 185, brought on by dieting. Examination of his heart disclosed a loud rasping diastolic murmur over the entire precordium with a heaving apex beat. He had no edema of the legs. The B. P. was 105/60. The aorta was dark, wide and expansile and the left ventricle was markedly hypertrophied. The blood Wassermann was 4 plus. He was given 6 doses of salvarsan by his physician, Dr. G., but developed chills and a temperature of 104° following the injections, so that they had to be discontinued.

Carotid sinus reflex was essentially negative.

CAROTID SINUS REFLEX		
Pulse Beats per 10 second Period		
	Right side	Left side
Before test	22	23
During test	20	20
After test	22	22

A diagnosis of *syphilitic mesaortitis with aortic insufficiency* was made and bismuth injections and iodides were advised. He improved remarkably for a while, attempted to perform the strenuous duties of his calling and the angina returned. He then consumed 135 tablets of nitroglycerin (gr. 1/100) daily for 2 weeks, developed progressive heart failure and died.

A leading symptom of this disease is angina pectoris. The pain may be very severe especially in an hypersensitive person or absent in one insensitive to visceral pain. Between these extremes there are numerous transitional variations. The conventional steno-cardiac pain after exertion or eating is by no means invariable. It frequently comes at rest, during the night and, as I have observed, rather frequently on bending forward.

The degree of response to painful stimuli may be roughly tested by ap-

plying deep pressure with the thumb to the styloid process (between the mastoid and the mandibular angle), a method introduced by E. Libman of New York. It should be done carefully by exerting equal pressure on both sides.

A hypersensitive person says "it hurts," and draws the head away; the normal one says "it is just the pressure of your fingers"; a hyposensitive individual says nothing when the test is made.

If pressure against the styloid of one side is more painful, the anginal pain is usually felt on the homolateral side. In such cases pressure over the brachial plexus (Schmidt) or the eye (Bernstein) may also be more painful on the affected side.

In a hyposensitive person, anginal equivalents must be diligently looked for. These commonly consist of disagreeable sensations in the chest varying from anxiety to a premonition of impending death, usually though by no means always, after exertion. Sometimes the sensation is not even projected to the chest. It may consist of an unexplainable "feeling of nervousness."

As a general proposition one may expect to find a typical reaction when a normal or hypersensitive person develops aortic disease. This rule is not invariable as the next case will show.

L. K., a 47 year old, highly emotional Jew with a metabolic rate of plus 12 and bilateral hyperesthesia of the styloids and ocular bulbs, but no brachial hyperesthesia, developed progressively increasing palpitation on exertion, nocturnal attacks of asthma and nocturia 1½ years ago. Several weeks before examination he suffered a severe attack of vertigo and vascular collapse. His

physician, Dr. S., found him with a cold clammy skin and later the systolic B. P. was 210. Ever since then his chief trouble has been palpitation on exertion, *paroxysms of nocturnal dyspnea and heaviness in the chest, but without acute pain. After careful questioning he admits only one attack of pain in the precordium and left arm.*

Examination: He had a dark, wide aorta and a slightly enlarged heart on x-ray. A delayed systolic murmur, a loud A2 over the aorta and a short systolic blow at the apex were heard. B. P. 183/105. *Carotid sinus reflex was strongly positive, especially on the right side.*

CAROTID SINUS REFLEX

Pulse Beat per 10 second Period	Right side Left side	
Before test	20	19
During test	14	16
After test	20	19

On February 20 a soft diastolic puff was heard to the inner side of the apex. Was this an aortic insufficiency? If so it would argue strongly for the luetic origin of the angina. A blood sedimentation reaction was done and found *decreased* (3½ mm. per hour, 60 mm. in 24 hours) and the carotid sinus reflex was positive. This *eliminated*, to my mind, the *diagnosis of syphilitic aortitis*, though his age was 47. The Wassermann on Feb. 21 was negative and supported the diagnosis of aortic sclerosis.

This case illustrates the existence of coronary (aortic) disease in a nervous hypersensitive man, which induced, instead of anginal pain, palpitation on exertion and cardiac asthma. The absence of pain in coronary disease in a hypersensitive individual is perhaps the exception to the rule.

Alarming dreams may arouse the patient from sleep with a frightful but not painful precordial sensation and constitute another variation of the anginal symptom (L. Braun¹).

A hyposensitive person may have extensive coronary disease, even a fa-

tal coronary thrombosis without pain. In this category is the sudden and unexpected death after a formal dinner casually ascribed to "acute indigestion", or the apparently healthy man who is found dead in bed in the morning, or the painless death during sexual intercourse (*la morte douce*). People with reduced sensibility to pain are likewise apt to be the carriers of painless duodenal ulcers for years. Amidst good health a peritoneal perforation or a severe hemorrhage discloses the presence of the treacherous lesion.

It behooves us, therefore, in hypersensitive people, to regard minor chest symptoms or simple indigestion seriously and to look for organic disease in the heart or abdomen. It is plain that the estimation of the reaction to pain should be frequently practiced.

The next sign in the triad which merits discussion, is the negative "carotid sinus reflex" (Hering). At the Boston meeting of the American College of Physicians in April, 1929, I² reported the occurrence of a positive reaction in non-syphilitic coronary angina. The case L. K., just described, illustrates this point. In luetic aortitis with angina on the other hand, the reflex is generally negative. In order to clarify these remarks it will be necessary to review briefly the physiology and clinical application of this reflex.

It is elicited by pressing the thumb over the common carotid artery at the level of the thyroid cartilage. At this point the vessel bifurcates into its internal and external branches and a slight bulging of the artery called "carotid sinus" may be felt. The heart rate is counted for 10 seconds, then the sinus is compressed against the

firm tissues of the neck for 10 seconds and the cardiac frequency is again determined. Similar counts are made for the following two 10 second periods. The reflex is positive if there is a distinct slowing during the carotid compression.

This is the old vagus pressure phenomenon described by Czermak,³ who thought it due to the mechanical stimulation of the efferent vagus fibers in the carotid sheath. His error has been pointed out by Hering⁴ who showed that even pinching the exposed vagus nerve, fails to slow the heart. On the other hand, light pressure with the finger on the skin over the carotid, a manipulation obviously insufficient to reach the deep position of the vagus, may cause cardiac standstill for 5 to 7

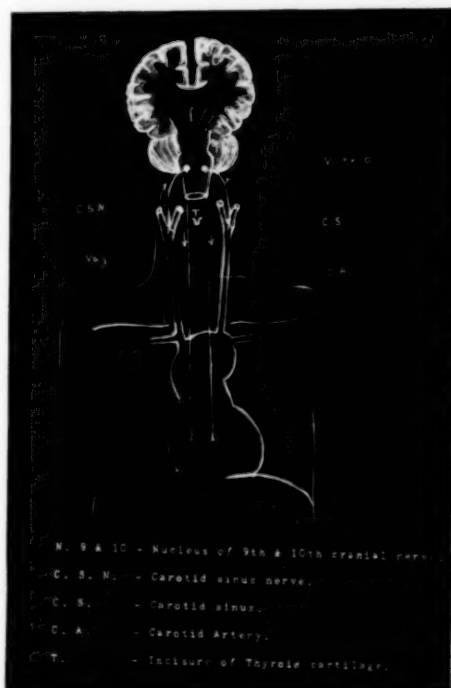


Fig. 1.

seconds. I have observed such reactions many times.

Hering proved that the afferent part of the reflex arc was formed by the so-called carotid sinus nerve, a small branch of the glosso-pharyngeal. The motor vagus fibers form the efferent segment of the arc. The reflex therefore starts from the carotid sinus and ends in the heart. The common nucleus of the 9th and 10th cranial nerves completes the arc.

Last year I suggested as a possible explanation for a positive reflex² an arteriosclerotic lesion at the carotid sinus. It has been shown by Chiari⁵ that this lesion occurs frequently in association with coronary arteriosclerosis. Mönckeberg⁶ confirmed his findings and said that these lesions are the earliest localizations of the arteriosclerotic process and occur often in young adults or even children. Thus the reason for a positive vagus response in cases of coronary (and carotid sinus) sclerosis is evident.

The importance of applying this test to young people even without angina is obvious. In a recent address by Joslin⁷ the existence of premature and serious arterial disease (coronary sclerosis) in youthful diabetics was stressed. This is but one instance where the test may be applied to advantage.

A little light on the otherwise obscure pathogenesis of juvenile arteriosclerosis was furnished by the work of E. Wolfkoff⁸ who found nodular thickenings of the intima in the coronaries beginning in infancy. These, of course, are physiological reactions. In young adults (32-36 years) the thickness of the intima exceeds by several times

that of the media, especially near the origin of these vessels. The superimposition of atheromatous lesions on a partially stenosed coronary, might seriously interfere with the myocardial circulation and offer an explanation for the frequency of the symptoms of coronary obstruction even in young people.

The following case may illustrate how the carotid sinus reflex may help to recognize pathology in the coronary arteries before the onset of angina or other clinical symptoms.

C. R., a 57 year old, healthy-looking business man consulted me because of generalized pruritus for 3 to 4 weeks especially on coming from a cold into a warm room. He noticed that the palms of his hands perspired freely. Thirteen years ago he suffered from pruritus which recurred during the following 3 winters. He had no precordial pain nor dyspnea, and his B. P. was 145/85. His urine was negative until recently when a trace of albumin and a few hyaline and granular casts were found. The physical examination was essentially negative, except for a slightly ringing A2 sound. The aorta under the fluoroscope was not dilated, but dark, the cardiac size was normal. Capillaroscopy showed a group of aneurismal and varicose capillaries in the skin near the nail-beds. Incidentally this was the anatomical substratum for his pruritus (cutaneous vasoneurosis). The blood sedimentation reaction was moderately increased.

CAROTID SINUS REFLEX

Pulse Beats per 10 second Period	Right side Left side	
Before test	10	10
During test	5	10
After test	10	10

Positive reaction on right side.

The presence of a positive carotid sinus reflex pointed to a sclerotic lesion of the right carotid and coronary arteries. The dark aorta and the ringing

A2 sound supported this diagnosis. This man had at the time of examination no cardiac symptoms, but on further inquiry, it was learned that he was rejected by an insurance company 11 years ago (age 46) for albuminuria and hypertension. Eight months after that, he was operated upon for a perinephric abscess, and 1½ years later his urine and blood pressure were found normal and he was accepted by the insurance company.

The positive carotid sinus reflex was the most significant sign of arteriosclerosis and dovetailed with the history of hypertension 11 years ago. He is probably in the *presymptomatic stage of coronary disease* at present. Further observation will be necessary in order to verify this hypothesis.

A positive carotid sinus reflex may therefore indicate coronary arteriosclerosis even before or without angina. Timely care of the heart and vessels may aid in prolonging life. In the case of *aortic syphilis*, this reflex is generally negative; carotid pressure fails to produce cardiac slowing. The reason for the negative reaction may be as follows. Syphilitic aortitis is generally unassociated with coronary closure or lesions at the carotid sinus unless complicated by atherosclerosis. Since such lesions are required to give a positive vagus reaction, its absence in aortic lues may be understood.

The third symptom is the rapid blood sedimentation rate. How can we explain this? It must be recalled that *syphilitic aortitis is an infectious process; aortic sclerosis is a degenerative one*. A fast sedimentation rate occurs chiefly in infectious conditions. It is however non-specific, occurs in

active infections, and is comparable to an increased leucocyte count. This test has been successfully used in following the progress of such infections as pulmonary tuberculosis, pelvic inflammations and syphilis. Active aortic lues is associated with a *fast sedimentation rate because it is an inflammatory disease*. Up to the writing of this paper, I have seen no case of active syphilitic aortitis without a rapid sedimentation reaction. For the performance of this test, the Westergren⁹ technique is recommended because of its simplicity.

The following case will serve to illustrate the error that may result from the misapplication of the carotid sinus and sedimentation reactions. In this patient, the *failure to sufficiently relax* the muscles of the neck to effectively compress the carotid artery, *resulted in a negative response*. At a later examination the patient relaxed better and a positive reaction was elicited on the right side. Another confusing feature in this patient was the fast sedimentation rate which was thought at first to indicate an active infection, perhaps syphilis. It was later accounted for by myocardial necrosis following coronary thrombosis. The latter condition, in my experience, is often the cause of rapid blood sedimentation. It is necessary, therefore, to insist upon the entire symptom triad for the diagnosis of syphilitic aortitis.

Case W. J. Y., 59 years old, suffered for the past 3 years from angina pectoris on exertion, particularly in cold weather or on walking against the wind. Postural dizziness, brachial paresthesia, anginal pain in the left arm, ear, face, and dyspnea on effort completed the picture. In the past year his symptoms had been quite severe,

though never as bad as during the month before examination. Since then he had been home and mostly in bed. The examination disclosed a muddy pallor of the face, the pupils reacted to light, the blood pressure was 135/85, sensibility to pain over the styloid was normal, the heart sounds were feeble and slightly irregular, the liver edge was a hand's breadth below the costal margin and over the left pulmonary base a number of râles were heard. He had no edema of the legs. The aorta was wide and the cardiac outline hazy on fluoroscopic examination. The lungs showed congestive hyperemia. Urine was negative except for a moderate increase in urobilinogen due to liver congestion.

The blood sedimentation reaction on two occasions gave a very fast rate; the first reading was 83 mm. per hour, the next one 95 mm.

The carotid sinus reflex at the initial examination gave a negative response. It seemed at first that with a fast sedimentation rate, it might indicate syphilitic aortitis. On the second examination, however, though the blood sedimentation was still fast, the *carotid reflex was distinctly positive* on the right side, so that for 4 seconds, there was *complete cardiac standstill*.

We still had to explain the fast sedimentation. An electrocardiogram showed a negative or diaphasic T wave in leads 1 and 2 with a convexity of the ST interval, indicating a myocardial lesion of coronary obstruction. It was obvious, therefore, that the patient was undergoing myocardial necrosis which accelerated the blood sedimentation. Negative Wassermanns with the different antigens and techniques excluded the diagnosis of syphilis.

The sedimentation test is extremely valuable when used judiciously. It can, however, be very misleading as the following case will show.

H. G., male 58, consulted me on Sept. 29, 1927, because of a vise-like constricting pain in the chest and abdomen after exertion in the past 8 days. Dyspnea was not present. Abdominal distension after meals and

nocturia had been present for 6 months. He was rejected by a life insurance company 6 months previously because of glycosuria.

He was a little man (Wt. 109 lbs.) with a grayish complexion and a B. P. 115/70, and his urine had only a trace of albumin. Eyes showed no arcus senilis. Heart: An irregularly intermittent rough systolic and a short diastolic murmur were heard over the entire precordium. On fluoroscopy a dilated aorta with a hypertrophic left ventricle were seen. There was no fever. A pericarditis was present, but its etiology was obscure. Was it rheumatic or epistemonocardiac?

Two years later he returned with entirely different complaints. He had lost 15 lbs., felt weak, had a dragging sensation in the lower abdomen and dyspnea on exertion. His B. P. was 95/60, his hemoglobin 56 per cent and his stomach contents showed a subacidity. *His blood sedimentation was very fast, 56 mm. per hour and 127 mm. in 24 hours. Carotid sinus reflex was moderately positive on both sides.*

CAROTID SINUS REFLEX

Pulse Beats per 10 second Period

	Right side	Left side
Before test	10	9
During test	7	6
After test	10	9

In view of the fast sedimentation reaction with angina the question of aortic syphilis arose. This diagnosis was excluded because the carotid reflex was positive and the Wassermann was negative. The diagnosis of coronary sclerosis is more likely and his pericarditis of two years ago was perhaps due to myocardial infarction.

To account for his sedimentation reaction one must assume either another infection or gastric subacidity. I have found the blood sedimentation increased in several cases of gastric subacidity. I fail to understand the reason, but offer it simply as an empiric

observation. In this case, therefore, the subacidity of the stomach may stand in some relationship with the fast sedimentation.

This case illustrates also the possibility of detecting coronary disease in the absence of anginal or other cardiac symptoms. The loss of weight with its consequent reduction of the load on the heart, may be responsible for the disappearance of the anginal symptoms.

With the help of the carotid sinus reflex, latent coronary disease may be recognized; even those who lose their stenocardiac symptoms, e.g., with the advent of cancerous or other forms of cachexia, may be diagnosed.

We must insist therefore, that the "symptom triad" be used collectively, not singly. A fast sedimentation reaction alone may be caused by infections, gastric anacidity, or myocardial necrosis.

Mrs. M. J., 65, with a history of rheumatic endocarditis in her son and grandchildren, had been complaining in the past 15 months, of attacks of palpitation and throbbing in the head. These started suddenly and ended more gradually. They came frequently during the night and awakened her from sleep. She also experienced palpitation and cold sweats on exertion but no dyspnea. The first attacks came after an emotional bout. The paroxysms of tachycardia kept the patient from sleeping. The essential features in her examination were a markedly dilated aorta on fluoroscopic examination; moderate hypertension, 185/85; slight bilateral arcus senilis; pupils reacted to light; a loud diastolic decrescendo murmur over the entire precordium, and a short systolic murmur over the aorta. The fingers showed a positive capillary pulse. There was neither edema of the legs, nor congestion of the liver or lungs. The knee jerks were normal and her hemoglobin 70 per cent.

The carotid sinus reflex was negative. In

view of this fact and the presence of a diastolic aortic murmur the thought of lues had to be considered. The blood sedimentation reaction, however, on two occasions (one year apart) showed fairly normal figures; the first test gave an average of 8 mm., the second 15 mm. per hour. To exclude lues more thoroughly, Wassermann tests (including the Kolmer) were done. The results were negative.

A diastolic aortic murmur in a person with a wide expansile aorta, without a history of rheumatic infection, would be taken to indicate lues, despite the negative Wassermann. The normal sedimentation rate, however, excluded active syphilitic disease. Diagnosis: Chronic rheumatic aortic insufficiency complicated by hypertension and paroxysmal tachycardia.

To further illustrate how the knowledge of this symptom triad may be applied to clarify other apparent imponderables, a case of combined syphilitic and sclerotic aortic disease will be presented. This diagnosis would be difficult with the usual clinical methods. The necessity for such an attempt arises particularly in the indication for treatment, since active specific therapy applied to an uncomplicated case of cardiosclerosis might react disastrously.

M. B., a 50 year old obese woman weighing 232 lbs., and only 5 ft. in height, developed dyspnea and precordial pain on exertion 3 years ago. One year later attacks of cardiac asthma followed by precordial pain during the night, came on. In one of these paroxysms she felt as though she were dying. The attacks would awaken her from sleep and compel her to sit in a chair with her legs hanging down in order to ease the breathing. Urination occurred 2 to 3 times a night but was reduced during her asthmatic attacks. The patient felt warm even in cold weather.

A significant point in her family history is that out of 10 children only 3 are living; the rest died in infancy. She had no spontaneous miscarriages however.

Examination: Pulse 96; respiration 46, deep, labored and noisy; B. P. 220/130, and the aorta was wide on fluoroscopy and percussion. On x-ray the lungs looked congested and hazy. The breathing was costal and the diaphragm was almost immobile during the attacks. She had a number of these in my office. During one of them, her breathing rose to 120, she was pale, perspired profusely and could not lie down. Heart sounds were loud, regular, with no murmurs; the rhythm at the apex was pendular. Lungs: A few submucous râles were heard over the lung roots, but not at the bases.

The urine contained albumin, and gave a 3 plus urobilinogen reaction; sugar was negative and specific gravity 1018. The Wassermann on the spinal fluid was 4 plus. The average blood sedimentation rate was 24 mm. per hour.

The Hering reflex was positive on the right side.

CAROTID SINUS REFLEX

Pulse Beats per 10 second Period

	Right side Left side	
Before test	15	15
During test	8	15
After test	15	15

Diagnosis: Tertiary lues is undoubtedly present. The high infant mortality and the positive spinal fluid Wassermann bear this out. We cannot, however, explain the positive Hering reflex and the hypertension without the diagnosis of arteriosclerosis. This reflex, even by itself, suggests aortic or coronary sclerosis. Attacks of cardiac asthma in my experience are more commonly present in non-luetic than in specific vascular disease. Therefore the diagnosis of combined syphilitic and atherosclerotic aortic disease was made.

A practical clinical point in this case was the "feeling of warmth in the skin" that this patient experienced. The close connection between the calibre of the arteries and the warmth (rather than the color) of the skin, has been emphasized by the recent studies of Sir Thomas Lewis.¹⁰ The

relation between peripheral vascular dilatation and cardiac asthma has been shown by Eppinger, Papp and Schwartz.¹¹ According to them it is the removal of the normal resistance in the arterioles that permits the blood to surge through the periphery and overwhelm the heart and lungs. These organs drown, so to speak, in the huge stream of blood coming from the periphery during an attack of cardiac asthma. Based on this principle, I have constructed an apparatus called the "Venostat" in order to shunt the blood in the four extremities, and so reduce the engorgement of the heart and lungs. The instrument consists of four blood pressure cuffs in series with a manometer. These are inflated to diastolic pressure and kept at this level for 10 to 15 minutes and gradually deflated. During the compression of the extremities, the blood pools in them because only the veins, not the arteries, are obliterated by the pressure of this degree. This whole subject has been fully dealt with in my paper on dyspnea.¹²

Venostasis was applied to this patient and the asthmatic attack stopped in about 5 minutes. This was repeated whenever the attacks recurred. It was not very long before we could keep the patient comfortable with only one application a week.

SUMMARY

The diagnostic triad of syphilitic aortitis consists of angina pectoris, a negative carotid sinus (vagus) reflex, and a rapid blood sedimentation reaction.

The variations and pitfalls of each of the symptoms are individually discussed.

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Agranulocytosis: Its Classification*†

Cases and Comments Illustrating the Granulopenic Trend from 8,000 Blood Counts in the South

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THIS new disease that we call agranulocytosis is an important addition to the list of dangerous diseases. A biologic condition exists in which the granulocytes are removed from the bone marrow and the blood stream. This is apparently a relatively new condition which emphasizes the necessity for blood examinations, and the fact that the granulocyte is apparently a biologic necessity for life, opens up a whole new world for research upon the blood. In no other condition is there so clearly an opportunity to study possible functions of these cells that have hitherto been unknown. A brief illustration is of value: For four days a strong man fifty-eight years of age feels sluggish and tired; the fifth day has a chill and fever; the sixth day, a higher fever; the seventh day, a slight redness of the throat and a restless stupor; the eighth day, coma and death. There is a negative history of infection, a negative blood culture; only an absence of granulocytes in the blood stream and in the marrow an absence

of granulocytes, myelocytes, and myeloblasts. What is it, and why is it?

Evidence has been presented in a previous paper¹ which showed the cycle of events in this disease. These events develop and follow in an orderly sequence. We have had nothing like it before either in biology or in medicine. In the beginning there is as yet no demonstrable infection, but only a selective hypoplasia or aplasia of the myelocytic cells of the bone marrow. The myelocytic series of cells either completely or nearly completely disappears. About four days after this event, the granulocytes are either absent or nearly absent from the blood stream. About two days after they disappear from the blood stream, the clinical onset begins, often in severe cases with dramatic suddenness, with collapse, chill, fever, red throat or ulceration of the mucosa, and stupor and death unless the granulocytes quickly reappear in the blood stream, because the marrow has begun to make myelocytes. If, and when, sepsis develops, it is a result and complication of the disease rather than a cause. ✓

When the clinician first sees a case sick enough to send for a physician, the patient has usually already gone

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through the first three stages of the disease, and death or sepsis or both are at hand. The three stages in order are bone marrow onset, blood stream onset, and clinical onset. The sepsis follows the disappearance of granulocytes from the marrow and blood. And their absence, after two to four days, more or less, causes characteristic mental and physical collapse and a decreased resistance to bacterial flora. Hence the complicating sepsis may result from the variety of bacteria ever present upon the alimentary mucosa and normally prevented from entrance and activity because of the quality of resistance conferred perpetually upon the tissues by the granulocytes. The complete absence of the granulocytes for a period of seven days, more or less, is probably incompatible with life. Immunity in the fullness of its powers is dependent, in large part at least, upon the persistent, daily contributions of these cells. The restoration of myelocytic activity in the bone marrow is apparently the only hope of recovery. Hence those cases that live long enough to develop sepsis have a better chance of recovery. Sepsis, or sterile abscesses, may be therapeutically valuable. Dysfunction of the myelocytic series may recur again and again, causing recurrent attacks of the disease.

As one studies the disease and its intimate problems, its very largeness appears and distinctions begin slowly to separate themselves one from another. The idea of a group of diseases and conditions whose very essence is a decrease in the granulocytes begins to assert itself. This decrease varies from a transient disease, a mild acute

granulopenia to complete disappearance of granulocytes and a tragic blood disease called, among other names, agranulocytosis. It carries with it so far as is known a definite pathology, and certainly a definite series of onsets, that entitles it to be regarded as a disease entity until proof is afforded that it is the result of, or a symptom of, some disease or condition. One studies the books on diseases of the blood and finds in the indices long columns on leucocytosis and but a few scant references to leucopenia, and those chiefly copied from other books and papers. Far more space is devoted to leucocytosis than to leucopenia or to the functions of the leucocytes or to both combined. What indeed is the meaning and what are the ramifications of leucopenia? For example, there are the cases of granulopenia even to the complete absence of granulocytes which result from poisons, septicemias, irradiation, and which characterize some primary and secondary anemias and leukemias and certain acute infectious diseases. And then as one studies several thousand blood counts made under identical conditions of climate, altitude, locality, and identity of race and technique, the impression forcibly asserts itself that the granulocytes collectively are not only mobile, but exceedingly labile as well, far more so than any other blood cell. They enter the blood stream in showers and die in showers; their ups and downs are frequent, the count is up now, the count is down now, but out of all these variations more facts and new groups emerge, revolving around the central fact of a granulopenia. In a large series of blood counts a considerable

minority present a granulopenia, relatively acute in one patient, relatively chronic in another. It is to this phase of granulopenia that we desire to contribute a few facts, tables and conclusions, after a brief consideration of a classification that for the present seems practical.

One very important point to be borne in mind is that the life of the granulocytes in the blood stream is approximately four days, or seventy-two hours, a fact gained by animal experimentation.² The normocyte lives about thirty days. The leucocyte must function very intensely to have so brief an existence and its functions likewise are probably most complex. The functions of the granulocytes are probably more complex and important than hitherto believed. Their important rôle in the ingestion of dead and living bacteria, and their service as a source of important proteolytic ferments has long been recognized. Much evidence has accumulated to indicate that these cells may be the chief source of supply for many of the various types of immune bodies, such as hemolysins, bacteriolysins, precipitins, etc.³ Therefore, when the granulocytes are markedly decreased or when they disappear, the resistance of the patient may fall to a low ebb and easy bacterial invasion may result.

There is evidence that a granulopenia is a more important biologic state and blood condition than it has been considered. An attempt to separate the granulopenias one from another and to classify them may be rather early, in that the classification may have to be revised again and again with new knowledge. Nevertheless, it af-

fords us a mental picture of the divisions that make up the group and that constitute the basis for future study.

THE GRANULOPENIAS

1. Acute granulopenia of unknown cause.
2. Chronic granulopenia of unknown cause.
3. Acute agranulosis with or without resulting sepsis.
4. Acute recurring agranulosis with or without resulting sepsis.
5. Chemical granulopenia, due to chemical poisons as benzol and arsenic.
6. Septic granulopenia, the result of general or localized septic processes.
7. Irradiation granulopenia, the result of exposure to roentgen and radium rays.
8. Anemic granulopenia, the condition accompanying certain splenic, aplastic and pernicious anemias, acute aleukemic lymphatic leukemia, lymphatic leukemia and certain secondary anemias with bizarre proportions of the lymphocytes and monocytes.
9. Infectious granulopenia, the condition accompanying certain acute diseases as typhoid, typhus, measles, mumps, malaria, influenza, dengue fever and certain pneumonias.
10. The granulopenia of Roseola infantum, also called Exanthem subitum.

We wish to discuss the first two divisions with cases and comments upon them, after a brief discussion of agranulosis, items 3 and 4.

Acute Agranulosis, With or Without Resulting Sepsis

This is the more common type of the disease. In the cases that die before the onset of sepsis, the overwhelming collapse from the mere and continued absence of the granulocytes is so great that death occurs before ulceration, necrosis or septicemia have had time to develop. Only a mild redness of the throat may be present, utterly unable of itself to cause or hasten death. The case given on the first page of this paper illustrates death without sepsis. We consider a case that shows no evidence of sepsis and in whom blood cultures are negative to be non-septic, unless at autopsy evidence of sepsis is afforded. One's own experience and the literature more generously, perhaps, afford examples of both varieties. Sepsis is to be regarded as a complication of agranulosis, a result of the loss of the protective immunity afforded by the granulocytes. It will be noted that we propose and have submitted the term "agranulosis," instead of "agranulocytosis." We believe this an improvement in the terminology of this disease, since it indicates the pathological process as clearly, and possesses the added virtues of brevity, simplicity, and easy pronounciability.

ACUTE RECURRING AGRANULOSIS WITH OR WITHOUT RESULTING SEPSIS

The remarks just made apply equally well to these cases. There is only one difference, these cases always recover from one or more attacks and have a second or additional attacks. One thinks of the relapse and the remission in pernicious anemia. Every patient with the disease is to be re-

garded as a candidate for a second attack. If he recovers from the first attack, daily blood counts offer the only opportunity so far known to follow the granulocytes upward as they approach normal and downward if the second attack follows and develops. Such counts, if possible, should be made at the same time daily and by the same technician using the same pipette. The granulocytes will show a definite drop to a few granulocytes or to complete absence about four days before the clinical onset begins. This is a better time to begin treatment than after waiting for complete agranulosis. One of our reported cases illustrates the recurring type. The literature affords examples of many recurrences in the same case and at varying intervals. Mild cases may recur at shorter intervals. The second and fatal attack in a man of sixty came ninety days after the first attack. The cause of the recurrence is an interesting problem. In the attack of pernicious anemia, the granulocytes often decrease with the normocytes and the characteristic granulocytes of pernicious anemia seem to be the first blood evidence of the attack and the last after remission has begun. If one could explain agranulosis, he might also be able to explain pernicious anemia.

ACUTE GRANULOPENIA OF UNKNOWN CAUSE

Here we are entering upon a rather chartless sea and much unexplored territory. Three illustrative cases may picture the types:

(a) A man of fifty-one in good health had been under much nervous and mental

strain for two years. At intervals during 1930, he noticed periods of a few days introduced by sleepy feelings, difficulty of waking, slowness and sluggishness of mind and body. After two or three days or a week, he would quickly become well again. A few small lesions of ulcerative stomatis would occur at this period. On December 1, 1930, an attack came, worse than before, accompanied by heavy lids, sleepy feelings, weakness, a desire to sit and be still or lie and sleep. This attack lasted six days and the white cell count was as follows:

	White Blood Cells	Percent of Granu- locytes	Number of Granu- locytes
December 1	5200	55	2860
2	4500	51	2295
3	4200	48 (ulcers	2016
4	3600	40 of	1440
5	5200	50 mouth)	2600
6	6000	56	3360

For the first five days the patient felt very weak, especially so on the fourth day. He began to feel better on the fifth day though the ulcers were then just beginning to heal. Another attack came on Saturday, March 14, 1931. After a hard week with much loss of sleep and strain, he awoke with heavy, sluggish feelings, burning upper lids, heavy limbs, and through the day, objects were rather dim and distant, memory poor even for events three hours before, and all day a sleepiness. A blood count showed a Hb. of 99 percent; W. B. C. 6600 and a differential of N., 46; L., 53; M., 1. The granulocytes numbered 3036, and on the next day, 3428. There were no ulcers with this attack. This patient can now because of his feelings come for a count and describe the onset, and as he says, "feel his leucopenia."

(b) In infants with very red and swollen gums and negative physical examination otherwise, save for temperature of 105°, an acute leucopenia may be the only positive finding.

(c) We have a definite account of a physician who in April, 1927, had an attack of agranulosis with chill, fever, red throat, granulocytes absent, lymphocytes 800. A

second attack came thirty days later. "In the year and a half that followed, whenever I was not feeling well the white count always showed between 4000 and 5000 whites with a corresponding fall in polys. I could always tell when a leucopenia was present. Since my retirement in 1929, I have slowly improved in general health, but it has left me with a myocarditis, and a loss of thirty pounds in weight that I have never recovered."

We have here three varieties of cases. The first in the man is acute granulopenia. In the third case there were apparently similar attacks of acute granulopenia, but he had recovered from two severe attacks of agranulosis. Is acute granulopenia a first step toward agranulosis, a mere difference in degree only, or is it a separate condition? The curious observation of Dr. Hines Roberts⁵ on teething with inflamed and swollen gums, as correlated with the adult with his aphthous ulcers is interesting if not significant.

We have so long looked upon blood counts as the result of extra-hemic states and disease except in the case of primary anemias, and then we have tried hard to find such extra-hemic states, that it is rather difficult to turn the tables and try to find which is cart and which is horse, whether a fall in the granulocytes may be the cause of the subjective body feelings, the weakness and the sluggish inertia of mind and body in these cases. To explain the cause of the fall in the granulocytes is quite another matter. A falling granulocyte count causes symptoms, the greater the fall, other considerations being for the time omitted, the greater the evidence of collapse, provided the element of duration be

also taken into account. The strange disease of infants and children, first described by Zahorsky⁶ and called *Roseola infantum* and *Exanthem subitum*, pokes its problematic nose into the picture. Here is a disease without symptoms save fever and without signs save an extreme leucopenia of 3000 to 7000, 10 to 25 per cent granulocytes, 75 to 90 per cent lymphocytes, a lymphocytosis, a rash on the fourth day, (a leucocyte lives four days) a fast fading rash on the same day and a quick recovery.

A child of eighteen months was taken suddenly ill with high fever on May 3, 1930. There was a slight gastro-intestinal disturbance. Family history and past history of no importance. Examination negative except a temperature of 104°. The W. B. C. were 3,000; N., 13; L., 86; M., 1. On the fourth day there was the typical rash of *Roseola infantum*. Temperature dropped to normal. Prompt recovery.

And then how much of the weakness in the acute infectious diseases is due to the disease itself and how much to the extreme granulopenia that accompanies it? Under this question might well be included certain cases of dengue fever, influenza without complications and typhoid without complications. Does this extreme leucocytosis in meningitis account for the amazing physical strength and endurance of certain cases as compared with the languor of certain mild influenza or dengue cases? And why is there a leucocytosis in pregnancy with so often the new health, the high spirits and the optimism of the pregnant woman? No matter what causes the leucocyte increase, do more granulocytes, a myeloid rise, stimulate strength and energy?

CHRONIC GRANULOPENIA OF UNKNOWN CAUSE

We wish to discuss more fully, item 2 of the classification, namely, a condition which we call Chronic Granulopenia. In 1910, Cabot⁷ called attention to the association of "some forms of debility" with an increased percentage of lymphocytes, "due in fact to the absolute diminuation of the neutrophils." Piney,⁸ in 1927, under the title "Leucocytic Pictures" interpreted a difficult case of a mentally defective man with a pain in the right iliac region who at operation showed adhesions around the cecum. The count showed 7,500 leucocytes of which the granulocytes were 48, the lymphocytes 49, and the monocytes 2 per cent. Cabot spoke of the condition as a "false appearance of lymphocytosis." References to similar counts occur in certain cases of the endocrine glands, and Clough⁹ refers to "debility" as one of the causes of the leucopenia. The intimation is rather common that this strange sameness of per cent and number of granulocytes and lymphocytes is the result of the debility, the adhesions, and the endocrine diseases. The lymphocytes are normal in number and size. In such counts the granulocytes and lymphocytes are about the same in per cent and number, so much so that we have referred to such an equality as the "fifty-fifty count," or, if persistent, a chronic granulopenia. If such a count is the result of debility, a neurosis, or, a chronic exhaustion, it is relatively unimportant, but on the contrary, if it may be the cause of such conditions, it becomes of real importance because it intimates that the origin of the syndrome may be in the

bone marrow and the weakness and debility be but a first degree of the real collapse that occurs in agranulosis when all the granulocytes are gone. We have reported a case in a woman who, in 1923, had a count of leucocytes, 7,400; granulocytes, 47; lymphocytes, 52; and monocytes, 1 per cent, or 3478 granulocytes to 3848 lymphocytes. Six years later this woman developed fulminating attacks of agranulosis and died in the second attack. In another case that developed, and died of, agranulosis, the count made was normal two years previously. But it is with these chronic granulopenias that we are primarily concerned and not with their relation to agranulosis. Wellman¹⁰ has recently reported an instance in which the patient complained of marked exhaustion with negative physical findings, but whose blood count was persistently low with a high percentage of lymphocytes. The relation of a few case reports will accent the type and the problems:

Case 1. N. B. A woman of sixty-one, well nourished, who complained of debility and gastric distress. Her chief complaint was weakness and lack of endurance. There was much mucus in the stomach and in the large bowel. Other examinations proved negative. She was a typical debilitated neurotic, always trying to be better. Her average count was 5,000; G., 50; L., 48; M., 2. In one differential count there were 17 "smudge" forms found, 100 cells counted. A sternal puncture showed myeloblasts, and myelocytes as well as young forms of granulocytes in degeneration, with vacuoles, pyknotic nuclei, and a few cells beginning to disintegrate.

The contrast between Figure 1, from a case of chronic granulopenia, and Figure 2, from a case of acute agranulosis, is interesting.

Case 2. A. M. P. A man of thirty-nine was first seen in June, 1922; height, six feet, three inches; weight, 140 to 150 pounds. Complaint was exhaustion and lack of endurance. Test meal, total acidity, 50; free HCl 32. Four counts were made from 1922 to 1931, as follows:

	Hb.	R.B.C.	W.B.C.	G.	L.	M.
1922	84	4,720,000	5,600	47	53	
1929	73	3,430,000	7,650	51	49	
1930	83	3,200,000	4,800	44	56	
1931	87	4,220,000	5,500	66	32	2

In this case the average of four counts over four years is 5,390 leucocytes, an average granulocyte count of 51 per cent, or an actual number of 2,749 granulocytes. An interesting finding in these patients is the occasional sharp variation in the percentage of granulocytes upward with the corresponding fall of the lymphocytes, and this whether the counts are made daily or from year to year. This is illustrated in the jump of the leucocytes in 1929 which, however, cannot be considered abnormal, and the rise in the granulocytes in 1931. The patient was of the opinion this last year that he was in better health than the years previously, business being so poor that he had been resting much more than usual.

Case 3. W. A. S. A man of forty-eight, minister, weight 141 pounds, height 5 feet, 11 inches; same type physically, though not so tall. Complaint of exhaustion and gastric disturbance. Hypotension. Normal gastric acidity. This man was a research scholar of high intelligence. He "gave out so quickly," he said.

	Hb.	W.B.C.	G.	L.	M.
1923	94	5,350	53	43	
1925	78	5,400	65	30	5

In two counts, two years apart, the leucocytes averaged 5,375 with 59 per cent granulocytes or 3,171.

Case 4. C. A. S. A woman of forty-four complained of nervousness, indigestion and easy exhaustion. Weight 149 pounds; height 5 feet, 1 inch. Gastric acidity normal. Both ovaries were removed at twenty-seven. Examination negative. Hb., 88; R. B. C., 5,400,000; W. B. C., 4,100; G., 48; L., 43; M. 8. Granulocytes numbered 1,968.

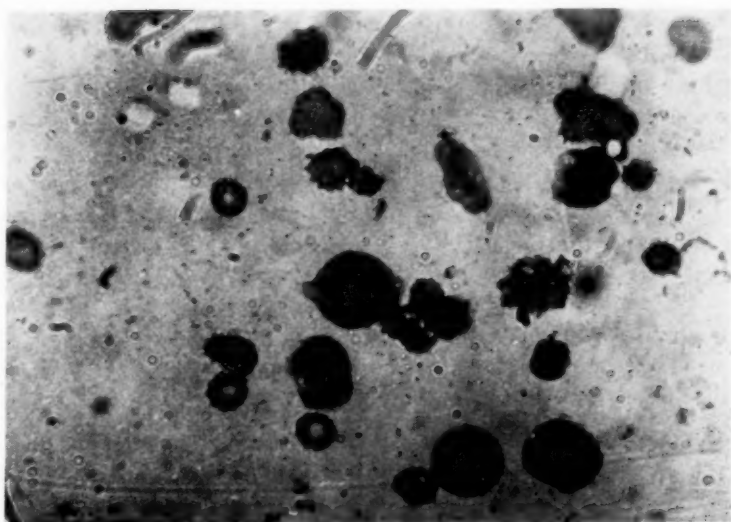


FIG. 1. Smear of bone marrow obtained by sternal puncture from a patient with chronic granulopenia. Note the evidence of cell degeneration, including irregularity of contour, vacuolization, loss of staining quality, and smudge-like appearance.

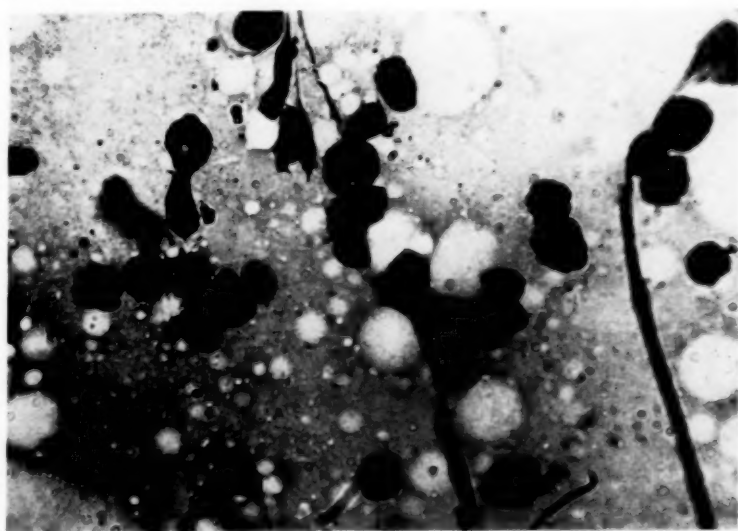


FIG. 2. Smear of bone marrow obtained 24 hours before death from patient with acute agranulosis without sepsis. Note the absence of granular cells, and evidences of degeneration in those present.

The obtaining of bone marrow by puncture of the sternum has been resorted to in a few cases of agranulosis,¹¹ and there is unanimity of opinion that the essential pathology is a marked and practically complete hypoplasia of the myelocytic tissues. Sternal punctures twenty-four hours before death in one of our patients showed a bone marrow that was entirely devoid of granular cells of any type, including even the myeloblasts.

Such a picture may be contrasted with that seen in bone marrow obtained by sternal puncture from a case of chronic granulopenia. The essential pathology in this condition seems to be unusually severe, rapid degeneration of the granular cells before they have had opportunity to escape into the peripheral circulation. Bone marrow smears in Case 1, (last series, above), show large numbers of so called smudge cells or degenerate leucocytes with numerous poorly staining, irregular, vacuolated, but immature granular cells. Apparently there is either a poor quality of cell produced or an unknown influence is injuring these cells before they leave the bone marrow and before they attain maturity. Special fat stains on these preparations do not show that this is a fatty degeneration.

In an effort to determine whether or not any relationship exists between the degree of granulopenia and certain signs and symptoms, from a large series of patients seen in private practice, a statistical study of 8,000 records was made. The patients comprising this group, for the most part, were those seen in office practice and consultation in the diagnostic clinic of

one of us over the ten year period from 1920 to 1930. Therefore, the class of patients in this group lends itself admirably for such a study, since very few showed acute illnesses in which the hematological findings would be temporarily abnormal. They were ambulatory patients and were not convalescent from any acute infectious disease. The study was conducted with the chief view of ascertaining the number showing varying degrees of granulopenia, comparing the signs, symptoms, and diagnoses of this group with those of the control group, and determining the influence of age and sex in the granulopenic group. The study is presented here in the form of tables and charts, and in certain deductions from the compiled figures, which may be made.

In order to properly classify the 8,000 cases into either the normal or the granulopenic group, an arbitrary standard of normality for the granulocytes was established. Accepting the figure of 6,000 leucocytes per cubic millimeter with 67 per cent neutrophils as being a low standard for normal,^{12,13} all counts below that figure were regarded as showing evidence of granulopenia. Converting this figure into terms of absolute numbers of granulocytes, any count showing less than 4,000 granulocytes per c.mm. was regarded as being granulopenic. In accordance with figures for normal leucocytes as expressed in various standard text books and by several authorities, we believe that 4,000 granulocytes per c.mm. represents a low, conservative estimate for normality.

It should also be considered that these white cell counts in this group were usually carried out on ambula-

tory patients, in whom the total cell count is probably higher than it would be at bed rest under basal conditions. The importance of this phase of blood counting has been well stressed by Garrey.¹⁴ The time the counts were made in this series was usually in the mid-forenoon or mid-afternoon and at a time when the patient was oftentimes on his first visit to the clinic and always at a time when he was undergoing a variable amount of strain and emotional stress coincident with the procedures carried out in a diagnostic examination. From a consideration of the above factors, it is probable that the white cell counts in this series were actually lower under normal conditions than indicated by these records.

From a study of the tables, it will be noted that one out of four patients showed a granulopenia. In the granulopenic group the count ranged from 4,000 down to below 1,000, with a gradual decrease in the number of patients in the more severe degrees of granulopenia.

Total number of records examined	8,000
Number of granulopenias	1,881
Number of normal counts	6,119

COMPARISON OF AGES WITH DEGREE OF GRANULOPENIA

Neutrophile Count	Males	Average Age	Females	Average Age
0-1000	5	47	3	44
1000-1500	13	27	15	39
1500-2000	30	39	59	41
2000-2500	102	40	103	37
2500-3000	126	39	160	41
3000-3500	300	40	335	40
3500-4000	227	45	403	38
Normal Count	2916	39	3274	33
Average of 1000 counts in 1919-20	9022			
Average of 1000 counts in 1930-31	8926			

GRANULOPENIC GROUP

Counts from 1-1000	8
Counts from 1000-1500	28
Counts from 1500-2000	889
Counts from 2000-2500	205
Counts from 2500-3000	386
Counts from 3000-3500	635
Counts from 3500-4000	630

Since acute agranulosis may be seen chiefly in the patient with granulopenia, this finding seems to be especially significant. In the granulopenic group, ten per cent of the patients came to the clinic with the chief complaint of weakness; in the control group, only five per cent gave this as a chief complaint. This finding seems important since much evidence has accumulated to indicate that weakness, exhaustion, fatigue, and tendency to sleep may be the chief results of a depressed granulocyte count. In the granulopenic group, eighteen per cent gave a chief complaint of nervousness, obscure as the term is, while twelve per cent registered this complaint in the control group.

GRANULOPENIC GROUP

Patients with chief complaint of weakness	190
Patients with chief complaint of exhaustion	75
Patients with chief complaint of nervousness	325
Patients with diagnosis of psychoneurosis	398

NORMAL GROUP

Patients with chief complaint of weakness	330
Patients with chief complaint of exhaustion	246
Patients with chief complaint of nervousness	732
Patients with diagnosis of psychoneurosis	1254

In the granulopenic group, twenty-three per cent of the patients were be-

tween the ages of forty and fifty; in the control group twenty-seven per cent were between thirty and forty. In the granulopenic group, fifty-six per cent were females. Therefore, the type of patients seen most frequently in the granulopenic group, was women between the ages of forty and sixty.

GRANULOPENIC GROUP

Patients in the first decade	46
Patients in the second decade	138
Patients in the third decade	307
Patients in the fourth decade	417
Patients in the fifth decade	434
Patients in the sixth decade	344
Patients in the seventh decade	195
Males	803
Females	1078

NORMAL CONTROL GROUP

Patients in first decade	168
Patients in second decade	440
Patients in third decade	1216
Patients in fourth decade	1661
Patients in fifth decade	1046
Patients in sixth decade	946
Patients in seventh decade	642
Males	2916
Females	3203

COMPARATIVE STUDY OF LEUCOPENIC GROUP AND CONTROL GROUP

AGE	Leucopenic Group (1881)	Control Group (6119)
Patients in first decade	2.4%	2.2%
Patients in second decade	7.2%	6.0%
Patients in third decade	16.3%	19.4%
Patients in fourth decade	22.0%	26.8%
Patients in fifth decade	22.8%	17.4%
Patients in sixth decade	18.2%	15.4%
Patients in seventh decade	10.3%	10.2%
Males	44%	48%
Females	56%	52%
Average age males	41.4%	39%
Average age females	39.3%	33%

CHIEF COMPLAINT

	Leucopenic Group (1881)	Control Group (6119)
Chief complaint of weakness	10.1%	5.4%
Chief complaint of exhaustion	3.9%	4.0%
Chief complaint of nervousness	17.3%	12.0%
Diagnosis of psychoneurosis	21.1%	20.6%

In an effort to determine whether or not any general differences may be manifest in blood counts done ten years ago and today, an average of 1,000 consecutive counts made in 1920 was found to be 9022, while the average of 1,000 counts made in 1930-31 was 8926. Leucocyte counts, as a whole, therefore, seem to be about the same as ten years ago. Since acute agranulosis has apparently been recognized within that period, this finding may be of some importance.

SUMMARY AND CONCLUSIONS

1. The importance of the leucopenias is emphasized.
2. The biologic and diagnostic importance of a leucopenia is probably as great as of leucocytosis.
3. A classification of the granulopenias is submitted.
4. Two conditions, acute and chronic granulopenia, are described.
5. Agranulosis is classified in the general group of the agranulopenias.
6. The relation of acute and chronic granulopenia to agranulosis is discussed.
7. The problem of granulopenia is studied in 8,000 private clinic patients.
8. One out of every four patients may be expected to have a mild granulopenia.

9. One out of two female patients between the ages of forty and sixty may be expected to show a mild granulopenia.

10. The complaints of weakness, exhaustion, or fatigue are twice as frequent in the granulopenic patients as in those with normal white cell counts.

11. White cell counts done today show no difference from those done ten years ago

12. A clinical syndrome, consisting mainly of weakness, easy exhaustion, tendency to fatigue, loss of strength and inertia, associated with a diminished number of granulocytes, is described.

13. The severity of the symptoms is largely dependent upon the degree of diminution of the granulocytes, with complete collapse in the most severe type, namely, agranulosis.

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An Evaluation of the Skin Test in Allergy*†

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THE word "allergy" as used in these remarks, has to do solely with the clinical condition that is represented by the asthma-hay fever-eczema group of cases. The conception of this type of allergy, as well as its rapid and extensive development during the past fifteen years, has been dependent largely on the skin test. The test consists of the introduction of extracts of foreign substances called "allergens" or "atopens," into the dermal cells. If there be antibodies present to the particular allergen applied to these cells, a reaction in the form of a wheal with a surrounding erythematous zone will appear.

When the test was first developed, it was assumed that an individual whose test was positive to a given allergen was constitutionally sensitive to this foreign substance. By the same process of reasoning, it was inferred that if the nose or bronchi were sensitive, the skin should be sensitive also. This point of view, which is still held by many, has not only been challenged, but from the clinical standpoint, at least, has been shown to be fallacious.

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Allergy is a localized process, and only certain organs of the body manifest it. This holds true, not only for man, but it is seen during anaphylactic shock in animals. The tissues participating in the process have been spoken of as "shock tissues." In humans, most allergic manifestations occur in the skin, in the respiratory tract and in the gastrointestinal tract. Allergy of the heart, thyroid, pancreas, bone, etc. are unknown. Not only do the skin, the respiratory and gastrointestinal tracts bear the brunt of most of the clinical expressions of allergy, but the rule is that but one, or a portion of one, of these systems is involved during a given attack. A patient usually has hay fever, or asthma, or urticaria, or intestinal spasm, and less frequently has two or more of these. In other words, his bronchi alone, for instance, may be clinically sensitive. This is demonstrated by the simple example of the child who has asthma whenever it eats wheat. Wheat, or its digestive derivative, is absorbed into the blood stream and circulates throughout the body. Only asthma results, because in the bronchi alone does the allergen find antibodies with which it will react. The skin may be sensitive, or it may not. If it is, a skin test to wheat should be positive; if not, no positive skin reaction is possible.

With this conception of allergy stated, one may inquire as to the value of the skin test. A difficulty at once arises, because none of the elements that comprise the test have been standardized. There is no one accepted method for preparing allergens, either in their dry state or as extracts. The introduction of allergens into the skin may be done in one of two ways, namely, the scratch method or the intradermal method. The latter is the more sensitive. There is no prescribed amount or strength of allergen introduced into the skin. And finally, the reading of the reactions is entirely an individual matter. This is, perhaps, the most important element, because if the skin be sensitive to a given allergen, some degree of reaction will usually come with any method. On the other hand, a delicate skin, or trauma, will often obscure results. The fact remains, that two observers who use essentially the same technique may report a very great discrepancy in results. One example records the divergence of 25 per cent and 74.9 per cent of positive reactions in bronchial asthma with the same method.

It has been stated that inasmuch as allergy is a localized process, the skin is not always sensitive. There are certain probabilities based on statistics, which are familiar to those who deal with allergy. For instance, positive reactions occur more frequently in younger individuals than in adults and tend to disappear toward old age. Positive reactions to foods occur most frequently during the early years of life, etc. The reliability of the test, however, can be stated only for a given technique performed repeatedly by the

same individual. To arrive at statistics otherwise, requires a consideration of the general results obtained by many observers, each using his particular method. The present study is based on such figures.

TABLE I.—POSITIVE SKIN REACTIONS IN 11,443 CASES OF ALLERGY

Allergic Manifestation	No. Observers	No. Cases	No. Positive Reactions	% Positive Reactions
Hay Fever	9	4381	4076	93.2
Vasomotor Rhinitis	8	1020	568	55.7
Eczema (infant and adult)	10	775	408	52.7
Bronchial Asthma	13	4809	2536	52.7
Gastro-Intestinal Al.	4	460	122	26.5

These figures coincide with the experience of many who treat large numbers of allergic individuals. There is a prevailing impression that for a reason as yet unexplained, the test is very reliable in hay fever. Here the skin and nasal mucosa appear almost always to be sensitive together. That this has little to do with tissue structure or function is demonstrated by the fact that in allergic rhinitis or "perennial hay fever," wherein the process in the nose is identical with that of annual hay fever, positive skin reactions occur in but 56 per cent of the cases. No sufficient data concerning positive reactions in urticaria and angioneurotic edema could be found, but the skin test in these conditions is notoriously unreliable.

Given, then, the average incidence of positive skin reactions in various

manifestations of allergy, the question arises as to whether there are any circumstances which may modify the interpretation of positive reactions. Unfortunately, there are. In the first place these reactions are not always constant. Positive reactions are arbitrarily indicated by + signs. A 1+ indicates a faint response and a 3+ or 4+ a large wheal. With the exception of response to pollens, positive reactions frequently vary in their intensity from time to time. A 2+ reaction may disappear a month later and reappear as 1+, or a negative response in a given case may not remain so, whether or not specific treatment had been given. For that reason, retesting as a routine, is practiced by many. Time will not permit a discussion of the possible factors underlying this phenomenon. Not only may there be variations in positive reactions at different times, but it has been shown that in a given case there may be a wide variation of response if the test is applied simultaneously to various sites of the skin. When these sites are sufficiently varied, a negative reaction may be recorded for the test done on the leg and a 3+ for the one applied to the back. (Figure 1). In such instances, it becomes difficult to estimate the degree of an individual's sensitivity by the skin test. The only thing one is permitted to say in that case, is that a certain portion of the skin of the back is sensitive, whereas that of the leg is not.

There is still another consideration of a positive skin reaction which leads to trouble, namely, the appearance of such a response to an allergen which obviously has nothing to do with the

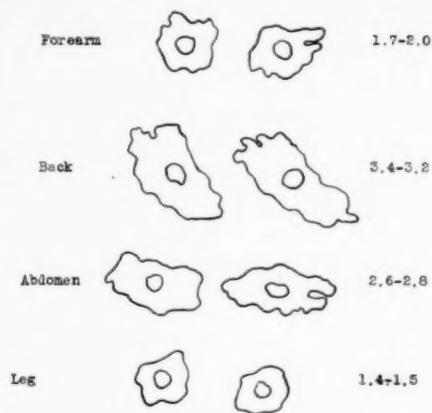


Fig. 1

0.02 cc. of a 1-10,000 dilution of ragweed pollen extract injected into various sites of the skin of a hay fever patient.

Figures—Area of wheals measured in square centimeters 15 minutes after injection.

history of a given case. Such a reaction is termed a "false positive." These occur so frequently that each positive reaction to be considered relevant should be tested clinically. This is done by the withdrawal of the given allergen from the patient's environment with subsequent subsidence of symptoms; and the re-introduction of the allergen with reappearance of symptoms. This, after all, is the only reliable check on positive reactions.

From these data, one may justifiably be discouraged with the skin test, when it is applied to most allergic conditions. This discouragement has been reflected in recent years by many who were led to believe in the adequacy of the test. They have been told that a negative response reflects on their performance of the test, whereas it is not a question of improper technique but of some condition inherent in the patient. (Some specialists use three hundred or more allergens routinely, but their results do not indicate that success lies in mere numbers). These remarks are not in-

tended to convey the impression that the skin test should be discarded, for it is as yet, by and large, the best means at hand for determining specific sensitivity, and when it works successfully it is most satisfactory.

Allergy is still growing apace and the number of sensitive individuals is, according to statistics, astounding. This fact demands that the great majority of such cases should be treated by the internist rather than by the specialist. An appreciation of the subject is, at best, difficult, and the vast amount of literature concerning it makes things no less confusing. As long as the skin test offered a reliable means of determining the specific allergen responsible for symptoms, there was a fair chance for anyone to work out a case. Since the test appears unreliable and difficult to interpret, some other approach becomes necessary.

One fact which offers a general, workable basis is derived from statistics, namely, that by far the greatest number of patients with allergy, some 80 per cent or more, are sensitive to comparatively few allergens. These, excluding pollens, listed in order, are shown in tables IIA and IIB.

If reliable extracts of these 25 allergens together with a few pollens most common to a given locality be applied to all cases, the chances are that if reactions are to occur at all, they will appear with them. These are the allergens to which one is most exposed. This fact is evident from the high incidence of reactions to such substances as wheat, egg, milk, feathers (pillows), and orris root, (face and talcum powders). Likewise foods that are starred in Table IIB are those

TABLE IIA.—INCIDENCE OF REACTIONS WITH COMMON ALLERGENS (32,182 TESTS)

Allergen	No. Tests Done	No. Positive Reactions	% Positive Reactions
* { Ch. Feathers { G. D.	5,491	1,130	20.3
Orris Root	2,537	429	16.9
Horse Dander	2,798	463	16.6
Wool	602	68	11.3
Pyrethrum	1,153	108	9.3
Cat Dander	1,667	154	9.2
Cattle Dander	745	65	8.7
Dog Dander	365	19	8.3

All others less than 5%.

*Ch.=chicken, G.=goose, D.=duck.

TABLE IIB.

Allergen	No. Tests Done	No. Positive Reactions	% Positive Reactions
Wheat	1,999	447	22.4
Egg	923	170	18.4
Milk	1,176	171	14.8
Chocolate	285	40	13.9
*Spinach	330	44	13.3
Bean	822	126	12.9
Potato	604	73	12.1
*Tomato	522	62	11.9
*Carrot	329	39	11.8
*Pea	548	63	11.5
*Barley	644	69	10.7
Rye	946	84	8.9
Pork	508	42	8.3
Beef	527	42	7.7
*Oat	1,711	115	6.7
Corn	1,774	117	5.7
*Rice	635	36	5.7
Pepper	452	79	17.5

All others less than 5%.

*Figures taken mainly from cases of infantile eczema.

which are given to infants who, when hypersensitive, are particularly susceptible to food allergens. In dealing with adults, one may omit these particular extracts and thereby lessen the number of allergens to be used routinely.

Should no positive reactions be obtained, if the patient be placed in an environment wherein he will not come in contact with these comparatively few allergens, symptoms will disappear in most uncomplicated cases. This is the basic anti-allergic régime in one form or another, on which most specialists place their patients, because these are

the allergens to which sensitivity is most likely to exist. To determine the allergen at fault, the patient is exposed to one or more of the substances suspected until symptoms appear.

A skin test correctly interpreted leads to a short cut, and it therefore should be done, at least with the allergens mentioned above. To be sure, there is a residuum of cases sensitive to other substances, or with complications, that require special treatment. A great many patients, however, may be treated successfully if they are protected from some of these common allergens.

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The Influence of the Practitioner of Medicine in Guiding the Public Towards Health*

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THE terms of the title assigned to me are too ambiguous to pass without definition. By the practitioner of medicine we usually intend to include only those physicians and their professional associates who earn their living chiefly, if not entirely, by using the sciences and arts of medicine for the diagnosis and treatment of disease as it is expressed in individual patients. Such physicians are by implication distinguished from those who are concerned with the prevention of disease through the authority and resources of official and volunteer health agencies. As I understand the use of words, both groups of physicians and their professional associates, by whom I mean nurses, social workers, dentists, and sanitarians, are practitioners of medicine, the private practitioner, general or special, being concerned chiefly with cellular and personal pathology, the practitioner of public health with social and geographic pathology. Knowledge of prevalence and prevention among the public of such diseases as are believed to be preventable is gradually approaching an exactness comparable to that of the processes and

expression of disease in the individual.

The function of the practitioner of individual medicine is conceived by the laity to be almost wholly the discovery of the nature of, and relieving the symptoms due to disease and defects of all varieties, whether of body or mind; that is to name and to treat disease, to relieve symptoms if possible, to cure sometimes, often to postpone death, and usually to give such comfort and courage in the presence of disease that can with our present knowledge be *neither* cured nor relieved, as the quality of human character permits.

The function of the devotee of public health is, in the words of England's eminent health officer, Sir George Newman, "to make a better tabernacle for the soul of man to inhabit," or in less imaginative terms, to adjust mankind and his environment so successfully that each individual may attain the amplest satisfaction in life of which he is capable, within the limits imposed by his inheritance of qualities and the economic status which society allows him.

Obviously the basic sciences upon which these two closely inter-dependent fraternities of the medical guild have erected the structure and conduct of their work are identical, the techniques and methods of application however

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differing widely. As the specialist in personal medicine extends his skill and knowledge far beyond the subject matter of his undergraduate curriculum, he who would deal competently with the group, the communal, the social expression of disease, and seek to accomplish prevention in the mass or the demos must add some understanding of vital statistics, sanitary science, epidemiology and social organization.

When using the term public health we rarely express clearly what is in our minds. We are apt to mean merely the sum of individual healths statistically expressed as morbidity or mortality, and their opposites vitality and longevity. To paraphrase an old medical aphorism. "There is no health; there are only healthy people."

In no true sense is there such an entity as public health, for the public, the demos, the crowd, the community of whatever size is in a sense perpetual if not immortal and yet lacking personality, and without birth or death can in only a figurative sense be credited with so intimate a quality as health.

It is the public as a composite of individuals of all ages and conditions which we wish to guide towards health.

May I, in further interpretation of the title, be permitted to sketch briefly the two eras through which we have in a measure passed and suggest the significance of the one at the threshold of which we now stand expectant but confused.

From just prior to 1850 until almost exactly 1900 public health established itself in general esteem by the application of sanitary science and the authority of sanitary law to the control of communicable diseases, chiefly those

conveyed by discharges of the intestinal tract, and those transmitted by vermin. The environment was the major issue and by improvement of water supplies and waste disposal, by housing reform and a generally higher level of municipal housekeeping the cities were brought to be a safer place for health than was rural America. During this era of sanitation the health officer and his supporting board of health were almost alone in the community in their concern with the application of medical knowledge to the conduct of public affairs. Their functions were chiefly conceived and executed in the spirit of the police, and often mainly for disciplinary purposes. Except during the throes of an epidemic, or threat of one they were unheard and unsung, and they lacked support of voice, opinion, or funds from the general public or volunteer associations.

With the initiation of the educational and social effort of the local committees for prevention of tuberculosis in 1900 and the following years, and the subsequent creation of the National Tuberculosis Association, there came a new, powerful and effective element which has stamped its character upon every phase of public health work here and abroad for the past thirty years. We may speak of this second era as that of public instruction. It was the statesmanship of Prudden, Janeway, and Biggs in New York and of their counterparts in other eastern seaboard cities which determined the features of this innovation in public approach to the then dominant cause of death. With the simple trio of facts in mind that tuberculosis is communicable, pre-

ventable, and curable it was clear that until every household in the land knew their significance, and could be persuaded into action, no amount of sanitary law or authority, no regulations or restrictions could be expected to avail.

It would be quite superfluous in addressing a medical audience today to elaborate upon the developments in the various special fields of health endeavor which have at times threatened to submerge science and reason in a welter of unrestrained propaganda and publicity. Enough to remind you of the essential similarity of plan by which social hygiene, child health, mental hygiene, heart disease, cancer, blindness, etc., have been brought to public notice in the successive waves of zealous health promotion.

It is true that state laws have in some places required the inclusion of simple facts about the causes and means of prevention of the common communicable diseases, Michigan leading far in the van. But it will be admitted I believe that it has been through the instrument of volunteer and chiefly lay organizations that the people, the public press, legislators and public officers have been reached with the message and promise of preventive medicine. If other evidence were lacking it would suffice to recall that the first division or bureau of a city health department entrusted with health education dates from 1914, and that the first such division of a state department of health was created in the following year.

You know, I am sure, the significant accomplishment of this second era, the stage of widespread public information about health and its attainment, dis-

ease and how to avoid it. Authority of statute law or local ordinance could not assume to require people to seek medical opinion for symptoms or signs of disease which in the private opinions of 1900 did not justify personal anxiety, prevent present enjoyment of life, seem to threaten self support or actually communicate disease to others. And yet prevention depended upon preparedness and priority. Every lesson of the laboratory and clinic taught us that a wide range of the less acute preventable diseases and postponable causes of death could be controlled or reduced only if the patient's discomfort was displaced by a physician's prescience as indicator for precautionary treatment or adjustment in the way of life.

The clinic of special skill for early recognition of disease, for its consecutive and persistent treatment, including guidance socially, economically, educationally, and often vocationally, was the professional resource towards which public health information was designed to persuade people.

We are still accruing incalculable benefits from the era of sanitation. We have hardly abated a jot in our devotion to the methods and objectives of the era of public information.

And yet we are fairly launched upon a most promising third phase, the era of general personal participation in health, and it is to a further definition of this, and with the hope of convincing you of the desirable function of the general practitioner in advancing it now and in the immediate future, that I wish to devote the main argument.

The date of origin of this era can

be quite precisely given as the Spring of 1922 when both the National Health Council, and the American Medical Association declared themselves of the belief that further advance in the application of preventive medicine demanded the widespread practise of the periodic health examination as a part of the service of the family practitioner of medicine.

This was not even nine years ago a new idea, for experience with a wide variety of public clinics, created under health authorities, in schools of medicine, in hospitals, and under social and philanthropic agencies had brought to accounting and attention an undreamed of mass of submerged and neglected invalidism, in persons carrying on their work and avocations without thought of complaint or belief that there was any other lot for them than handicapped existence.

Out of every ten persons coming for expert opinion on a possible or suspected pulmonary tuberculosis, seven are found to be non-tuberculous, and yet bearing a burden often of another remediable or at some stage preventable condition. In every hundred children presenting themselves for schooling at least 65 per cent are found to have one or more potentially if not at the time, disabling and preventable defects. Every review of bodily fitness among men and women whether for industrial or military needs, or for civil employment, reveals the extent to which unnecessary and readily avoidable disease or disorder of function and structure can prevail without knocking at the attention of the patients or driving them to seek medical care.

What is proposed in order to put to

work the knowledge of prevalence and prevention of disease, which has been accumulated with care and precision in hundreds of educational and research institutions, and by the contributed devotion to fact of still more thousands of medical practitioners? What is the influence which physicians in their personal relationship hold which is of greater persuasiveness towards health than can ever be the authority of law, its enforcement by public officials or the ingenuity and plausibility of generalized popular health promotion through slogans, campaigns, drives and objectives of volunteer or non-official health agencies?

The influence, potential and actual, of the practitioner of medicine, though small in amount at present and applied but haltingly and with diffidence, in persuading the public towards health is seen at its best in pediatrics and obstetrics. It consists in his knowledge of healthy structure and function, deviations from which he has in the past been chiefly concerned with detecting, measuring, and treating. Physiology rather than pathology is the basis upon which his power of direction of human life in health is built.

The obstetrician whether in the person of the specialist or of the general practitioner has accepted evidence accumulated by studies of a statistical and epidemiological character to the effect that prenatal supervision of the expectant mother can be relied upon to reduce the proportion of stillbirths, lower the neo-natal mortality rate, i.e., deaths in the first month of life, and increase the probability of survival of the mother with a minimum of post partum morbidity. Incidentally good

prenatal care at present carried out contributes largely to a reduced prevalence of syphilis. In his capacity of private practitioner of medicine the physician called upon to guide the pregnant woman can and does contribute to the sum total of community health to a degree and in a quality of service which it is most unlikely any other professional agency can replace.

Health departments may for the *dependant* expectant mother facilitate by organization the provision of medical and nursing care during pregnancy, and at and after confinement, but it will always remain for the private practitioner to exert the greatest influence in this field.

At the present time probably not as many as one quarter of the expectant mothers of this country are receiving a medical guidance towards health which is known to be desirable, economically practicable, and productive of a very tangible degree of life saving.

It remains primarily for the physician in private practice to persuade his families of the value of prenatal supervision.

It is to the pediatricist, however, that public health owes its largest debt of gratitude, for it has been to his credit that the healthy babe put in his trust at birth has received increasingly complete health service, whatever the economic status of the parents, until the child is by law at liberty to engage in self-support and escape the application of compulsory education.

No single element in the advance of preventive medicine has contributed so much to the increase in average expectancy of life, to the prevention of

infant mortality, and the reduction of many of the communicable and nutritional diseases of childhood, as has the introduction of health supervision, as a function of the ordinary personal or family practice of medicine, and into the routine of organized public health work.

In infancy, during the pre-school age, and for school children it is now usual to provide, at public expense where necessary, but to an increasing degree through the family physician or the child specialist, a supervision of growth and development, the establishment of at least two specific active immunizations, and medical and dental health examinations, at appropriate intervals, not for the purpose of detecting disease but with the object of establishing and maintaining life, and its most important functions in childhood, growth in physiological equilibrium, together with avoidance so far as may be of communicable diseases, and developmental defects. We know now that where our city communities are alert to use and supply health services for children, of those from two to five years of age 75 per cent or more have at least an annual medical examination, 30 per cent have a dental examination, 35 per cent to 50 per cent are vaccinated against smallpox and about 50 per cent are known to be immune to diphtheria. In no community are these four measures compulsory for pre-school children and it is to be hoped they never will be. In but few are any but smallpox vaccinations required for children entering school. The influence of the medical practitioner and his associates is seen at its best in that field of preventive medicine where

there will probably never enter the authority or obligation of law or ordinance. No advocacy of health measures is listened to with the respect accorded to the family physician's voice.

Each specialty of medicine and surgery has awaiting it a field of effort similar to that so vigorously cultivated by the obstetrician and the pediatrician. The orthopedist, ophthalmologist and neurologist share with the dentist, the internist and the dermatologist a responsibility for guiding the public towards health by appropriate personal persuasion and example.

The success of each organized effort for control or prevention, whether directed against tuberculosis, syphilis, cancer, diabetes, emotional catastrophe or blindness, has been created in the relationship between physician and patient in which the former matches his skill, his imagination, his physiological acumen against the probability or significance of sub-clinical manifestations of disease, or his knowledge of the usual results of disorderly or immoderate ways of living.

The individual physician can rarely accumulate sufficient personal experience with disease, or the variable conditions under which health occurs, to avoid a high degree of probable error in his conclusions as to the relation between cause and effect of personal habits, over weight, under exercising, short sleeping, too much, or disproportional eating and drinking. He needs must rely upon massed experience, and learn to apply other people's assembled facts to the individual man or woman before him. He must learn that there are at least as many ways of healthy

living as there are kinds of disease, and that the essence of his particular privilege is attaining the optimum of health, not the mediocrity of average health, or the mere negative success of freedom from disease, for the client who seeks his guidance.

We have attempted through government great accomplishments in mass prevention of disease. There are now incorporated into our social order functions which could under no safe conditions be trusted to the individual or to the family. We pay perhaps a half dollar, at most a dollar and a quarter, often not more than 25 cents apiece each year to secure the administration of public service for health. Of this about a cent and a half a year goes for the registration and analysis of births and deaths, 8 cents for communicable disease control other than hospital care, 4 cents for tuberculosis, and a cent and a half for venereal disease control, the price of half a glass of milk, 3 cents, to guarantee a tubercle free pasteurized milk supply, as much as five cents apiece for the safety of maternity and infancy, thirteen cents for school health, a trifle of ten cents for food and environmental sanitation, four cents for laboratory work, with six cents for administration including health education. And all this is for a rather crude broadcast type of mass protection. And yet how priceless the benefits, how totally has the outlook of man and his wife and child been altered by even this wholesaling of health. In Philadelphia in 1929 the per capita cost of medical care of all kinds was \$52 of which about two dollars went for prevention. The people of an average midwest rural county

spend \$22 per capita each year, of which about 2 per cent is for health. The health officer must operate his specified services under the limitations imposed by partisan politics and insecure tenure of office, by restricted funds, by the tardily advancing common sense of the populace, and he sees much ahead which he can do to improve water, milk, public understanding, immunity, and physical environment, but even the ablest and best supported, the honest and fairly permanent commissioner of health of state, county or city will quite frankly declare, or admit if challenged, that his potentiality for good is but a fraction of what can be the certain result if physicians in private practice were to enter with as much determination upon health guidance, as they now devote to disease detection and repair.

The future of preventive medicine, the adding of the next and most difficult ten years to the expectancy of life, awaits the universal participation of the practitioner of personal medicine and his patients in the practical use of our abundant knowledge of health development and protection.

It will not be by compulsion or ordinance that the obese, arteriosclerotic, diabetic, or cancer patient will begin to decrease among us, or survive into the allotted seventies, but by such universal voluntary self-interest in health and the management of the later decades of life as will permit the detection of pre-clinical signs and symptoms which may lead to prevention by minimal changes in the conduct of life, without the panic fear of late inevitable disclosure of advanced irremediable disease. Only through the words of the family physi-

cian trusted in birth, sickness, and death will parents and other men and women be persuaded to legitimate and persistent interest in health, and this only when the example of the physician toward his own family and dependents carries conviction of his sincere belief that personal medical practice is capable as much of advancing individual health as it is of relieving and sometimes curing disease.

The influence of the practitioner of medicine in guiding the public towards health is as yet unevenly applied, doubting, almost scoffing, except for the beginning periods of life and growth. It is capable of benefits, to a degree so far surpassing the possibilities of public health agencies, as to justify criticism that it is too timidly conceived.

Constructive nurture often assumed under modern medical statesmanship to be the province of public health becomes effective only when it has lost the implication of generalities and assumes the character of personal guidance by the practising biologist of today's society, the family physician. To quote from a recent article by Lord Dawson of Penn, "The more the cost of social policy is centralized, the farther its administration removed from the man who receives the benefit, the more apt is that man to lean upon a prop, to become a creature of fate rather than a master of effort." The influence of the family physician is at its best when it activates the individual to acquire health by the exercise of his own character, to prove to himself that health is a by-product of initiative and effort.

We have adapted ourselves more ef-

fectively to our zoological enemies than to the successes of our material prosperity and the mechanization of today's existence.

Are we not committed by our professional philosophy to that third gospel as Dr. Osler described it: "The gospel of his body which brings man into relation with nature, a true *evangelion*, the glad tidings of a conquest beside which all others sink into insignificance, the final conquest of nature, out of which has come man's redemption of man"? Whether we dream with Plato or fling out the challenge with Dr. Holmes—the temper of thought remains the same. Plato looked to the day "when our youth will dwell in a land of health and fair sights and sounds, and receive the good in everything, and beauty, the effluence of fair works shall flow into the eye and ear like a health giving breeze from a purer region and insensibly draw the soul from earliest years into likeness and sympathy with the beauty of reason."

Dr. Holmes, in addressing the predecessor of our present public health association in 1860, foretold the chang-

ing emphasis from curative to preventive medical practice, and gave prophecy to the thoughts of today in the following stanzas.

"What though our tempered poisons
save

Some wrecks of life from aches and
ails:

Those grand specifics Nature gave
Were never poised by weights or
scales!

God lent his creatures light and air,
And waters open to the skies;
Man locks him in a stifling lair
And wonders why his brother dies!

In vain our pitying tears are shed,
In vain we rear the sheltering pile
Where Art weeds out from bed to bed
The plagues we planted by the mile!

Be that the glory of the past;
With these our sacred toils begin:
So flies in tatters from its mast
The yellow flag of sloth and sin,

And lo! the starry folds reveal
The blazoned truth we hold so dear:
To guard is better than to heal,
The shield is nobler than the spear!"

The General Practitioner and the Public Health Program*

By FELIX J. UNDERWOOD, M.D., F.A.C.P., *Jackson, Mississippi;*
President, Southern Medical Association

IT IS to the credit of our profession that its members have interested themselves actively in good government, and especially in those functions that have to do with the physical well-being of man and that involve applications of medical art and science both in the prevention and the cure of the diseases which afflict mankind.

There is not a single point at which public health and private medicine cannot march forward in peace and good will. Our profession is traditionally committed to the prevention, as well as the cure, of disease. Out of its early labors arose the first slender shoot of this magnificent tree of health that is beginning to bear good fruit today. From its membership have come our foremost public health leaders. Be it said to the everlasting credit and to the honor of American physicians that they are watering, fertilizing, and protecting this tree of life in the midst of the garden of our united effort against the insects and poison bugs of ignorance, superstition, and of rampant quackery which establishes so-called health institutes, health homes, adver-

tises so much about your health and often puts it over on a gullible uninformed public and yet knows little or nothing of medicine, either curative or preventive, notwithstanding the fact that they pose as physicians and talk glibly and advertise freely to prevent and cure all diseases which afflict the race. They bitterly oppose the principles and practice of preventive medicine, denouncing immunization and vaccination. They profess not to believe in the germ theory of disease yet so ignorantly inconsistent are they that most of them now tell people that immunization and vaccination cause many diseases such as syphilis, typhoid fever, meningitis, and within this week I have had otherwise intelligent people call me and tell me what "doctor quack" said about it.

Do we need a consistent, persistent program of health education and demonstration backed up by the physician one hundred per cent for the enlightenment and for the protection of our citizenship in every county, in every community, in every home, and with every individual in our State? Do we? Health education like Christian education is a real job in this day and time when evil forces are presenting

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a united front. We must stand united in our efforts or we fail miserably.

The most obscure physician gives some portion of his energies to the conservation of health and usually lends his voice in support of public health measures.

Lack of information is a universal fomenter of strife. For the physician disciplined in diagnosis and therapeutics, the private relationship between patients and practitioner circumscribes his horizon. That medicine also fills a public relationship, in which the good of the individual may frequently be submerged by the greater welfare of the group, is outside the compass of his vision. He is unwilling to admit that a mass of information and a technique have grown up within the realm of preventive medicine and sanitation that are generally ignored in our medical schools, yet are just as valid as the subjects regularly taught. The smattering of so-called "hygiene and public health" that was forced on him in student days appears to him to comprise all that is or needs to be known. Every health officer is acquainted with private practitioners who freely admit their ability to fill any public health position with distinction with no previous training. A mind that is permanently closed to new knowledge in other spheres than its own will discount all such new ideas as negligible or subversive of the regular order. Even the physician with a reasonably flexible mental apparatus is often amazingly uninformed of the first principles in preventive medicine and sanitation, a field so closely allied to his own that curiosity alone would seem to compel superficial acquaintance. Out

of this lack of information grows resentment toward even the simpler routine procedures of common sanitary practice. An attitude is created which evinces itself in unthinking resistance to all that bears the label of public health. Fortunately, this inertia is not often found among physicians.

However, not all of the blame is on one side. The public health worker must share some of it, for he fails many times to make any effort to enlighten the physicians within his field as to his plan and methods. A full explanation, at the outset, would usually convert medical opposition into acquiescence, at least, if not hearty support. His first duty is to educate the doctor, for we are all laymen outside our own specialties. In this, as in every succeeding step of his program, the utmost tact is essential. Painful memories rise to haunt the health executive who has had under his direction any number of workers. He has seen, more than once, an initially friendly group of medical men turned into enemies of the entire health program through rudeness, arrogance, superciliousness, bad temper, or lack of public health training on the part of a new worker. The medical profession has suffered much at the hands of such as these. Unsound judgment in selecting a project, or offensive methods of promoting it, will also alienate friends.

Of one cause of medical opposition, selfish, mercenary motive, the less said the better. But all experienced health officers have felt its force. The physician of this caliber is so frequently aggressive and "successful" that he holds an influential position in his com-

munity. By underground methods he can defeat an honest, well considered project without revealing his hand. That he fears the specter of diminished business is simply evidence that his selfishness is matched by his ignorance, for the real all-time well trained health officer is a press agent of scientific medicine. Or this kind of physician may covet a place on the public payroll for the money or the publicity to be had out of it. In any case his personal gain is made to transcend the public welfare.

We who hold positions with the government are always under some suspicion—a suspicion that seems to be growing stronger of late, that is taking the form of a great fear, fear of ultimate domination over all life by an autocracy of bureaucrats. Perhaps some of this suspicion is deserved. Dictatorial, grasping, impractical, politically partisan persons are found in health departments as in other branches of the government. To inject a degree of humanness into an office crowded with necessary routine, to retain a sensitive awareness of the multifarious viewpoints in a large constituency, is no sinecure. Yet the more successfully it is done, the more fully will needless suspicion of governmental agencies be overcome. It is a paramount duty of all public health executives.

Granting, then, that there is sometimes divergence of interests between public and private medicine, where there should be convergence; that there is antagonism where there should be accord, it will be profitable to consider its effects. They will manifest themselves in two directions: retarda-

tion of sanitary progress in many quarters, and a growing distrust of the medical profession on the part of the public. Enough examples have been given earlier to clarify the first point, that lack of medical support, or active opposition, will delay legitimate public health developments. But the effect of this attitude on the lay mind may not be so evident to the private practitioner. To the medical health officer, standing midway between him and the public, a view in both directions is possible. He catches a sense of frustration and of growing exasperation among the laity, that is not revealed to the family doctor so freely. He finds the public demanding more service, while his medical colleagues criticize what is already given. He realizes that the public is often more fully "sold" on the health program than is the profession. His dilemma is sometimes acute. As a public servant, his duty is to do the public's will. Yet, if he accedes, it will bring to light the reactionary tendency of the medical group. He feels himself a Judas among his brethren. If such a crisis arises, as it has repeatedly, the layman develops a distrust of the physicians; he is openly critical of their motives and his resentment is likely to be extreme. Are not the proposals for health insurance partly the result of just such a process? Are they not the grasping of the public after some method whereby the benefits of curative and preventive medicine may be made available to all, and at once, without waiting for the medical profession to arrive at a broader social outlook? This is not the sort of thing that the great body of health workers

desires, but it is a very natural reaction of enlightened public opinion. "Phantom" this public opinion may sometimes be, but it is a ghost that takes on substance as it gain momentum.

If the discussion so far is a correct interpretation of trends, some solution is sorely needed. Not that we may hope to change human nature, if the fault lies there, but that we may try to bring about more intelligent understanding on both sides and a resultant solidarity now lacking.

Beginning with his earliest medical training, the student should be made to see how his subjects are related to public health. In bacteriology he can learn the uses and duties of state and city laboratories, the methods pursued by them and interpretation of their reports. Lecturers on practice of medicine ought to lay more stress on sources and modes of infection, on ordinary control measures and on the duty of the private physician to protect the community as well as his patient. Courses in pediatrics open the way to the whole field of child hygiene, while obstetrics holds the same relationship to prenatal and maternal hygiene. Medical jurisprudence embraces legal aspects of the practitioner's public health functions. And, lastly, the course in preventive medicine, hygiene, and sanitation should be the point at which these strands are woven together; where the embryonic doctor sees the whole public health field, and comprehends the fact that he has a prominent and inescapable position in it. Do we have such correlation in our medical courses today? Hardly. Most of the men who are teaching major sub-

jects in the schools are themselves lacking in this vision. Can more be expected of the people, when their leaders fail?

The medical practitioner has a real place in the public health field. As a matter of fact, preventive medicine is going to consume an even greater proportion of his time. This does not mean those ordinary things that are expected of every conscientious doctor, such as early reporting of morbidity and of births, administration of prophylactic biologic preparations, efforts to protect the community against the infection of his patient, and occasional help in various clinics for the indigent. These he does now to a greater or less degree. But preventive medicine has taken on a broader meaning in recent years. There has come a realization that humanity can be made healthier, and happier, by the early detection and correction of minor deviations from normal, than by curative measures applied after these conditions have produced gross pathology. "Positive health" is as good a name as any for this new objective. And the family doctor is its prophet. Better than anyone else, he can, if he will, make the next generation more fit than its predecessor. This calls for a personal relationship that no governmental agency can so satisfactorily provide. Opportunity is in the making for the private practitioner to take his own peculiar place in the public health movement. Technical preparation there must be, exactly as one would fit himself for any other special procedure. A new approach, a new viewpoint, must be acquired. He is dealing with a well man who wants to keep well.

The health officer prepares the way by education and the physician should make ready for the future that lies in that direction. The American Medical Association has repeatedly endorsed this program. Likewise, state and county societies here and there have caught the meaning of it. But until the man in general practice makes it a real part of his everyday business, it will remain only a pleasant topic of conversation. This is the challenge of the sanitarian to the private practitioner.

Wrapped up with these matters that have been touched on are problems of the medical profession far more profound and significant. What does it mean that there is an active demand in some quarters for a kind of state medicine? Why do we see such contemptuous disregard for the fine fruit of scientific medicine, while any new and blatant cult receives enthusiastic welcome? Opposed as these two trends may seem on the surface, they arise from a common source: lack of socially minded leadership within the

profession. Broadminded, strong, resourceful leaders can point the way and can knit our individualistic membership into a well coordinated group for the solution of these difficulties. Without that, we may have forced on us a ready-made scheme of social medicine.

In other words, the public wants and demands a complete program of health and healing, of which every individual may have the benefit without undue sacrifice, and it is going to have its way somehow. We have the requisite knowledge and skill. Are we intelligent enough to cooperate in meeting this need with a plan of our own devising?

This may seem far removed from the subject of "The Relationship of the Private Practitioner to the Public Health Program," but it is not. That relationship is merely an expression of his outlook on life. The keener our sensitiveness to human need in the aggregate, the brighter will be the hope of fulfilling our ultimate destiny as a profession.

Editorials

EDITORIAL POLICIES

That there will be no abrupt change in those editorial policies under which the *ANNALS* has prospered so greatly, it is needless to state. The present editor has been in close touch with the development of this journal during the past seven years and is fully in accord with the general plan of its organization and production as it has been evolved during that period. He will constantly strive to make the *ANNALS* representative in the highest sense of the American College of Physicians of which it is the official organ. He believes that this can best be done by continued emphasis upon the quality of its scientific articles in order that they may represent, in so far as is possible, not only the most advanced but also the most mature, medical opinion of the times. To this end he invites the submission of manuscripts from both non-members and members of the College and promises that careful consideration will be given to all. Since there are certain fixed limitations upon the size of the annual volume, selection of the most useful material must be made and authors whose manuscripts are returned to them are urged to bear in mind that there are other considerations than the actual worth of the subject matter of a communication which may lead to its rejection. It may deal with a field which is not of

interest to a large number of the readers of the journal; it may treat a subject in too extended a manner to be suited to the size and spirit of the *ANNALS*; the same subject may have been discussed in a recent number, or another paper covering the same ground may have been accepted but not yet published.

In general, the freedom in respect to diction and style which has been allowed authors in the past will be continued. No effort will be made to develop uniformity of expression at the cost of individuality. The editorial pencil will seldom be used except to correct verbosity and ambiguity. However, in the interests of better appearance, greater economy in production and heightened usefulness, the bibliographic references are to be standardized within certain limits. Brief directions in regard to the form desired may be found on the back cover of each number.

In order more fully to represent the broad interests of the American College of Physicians it is hoped to place upon the editorial pages rather frequently communications from those whose special interests, training or experience give their opinions authoritative weight. Such contributed editorials will be initialled to differentiate them from those for which the editor is alone responsible.

CARBON MONOXIDE DEATHS

Litigation based upon the circumstances attending carbon monoxide, and particularly 'garage', deaths is constantly increasing. Physicians should exercise great care in certifying to the cause of death in such cases. The question which usually arises is as to whether death was accidental or suicidal. Since investigation of possible motives, of the behavior of the deceased in the last few hours or days of his life and of all of the minute details of the surroundings amid which the body was found may be necessary for reaching a decision, it is evident that the physician who answers an emergency call and determines that death has occurred cannot be expected to pass final judgment upon the question of accident or suicide at the moment. Unless he is himself a coroner or coroner's physician it should not be his duty to do so at any time, but the family of the deceased may look to him for an opinion. There have been numerous instances in the last few years which make it evident that knowledge of 'garage' deaths is so generally disseminated among intelligent laymen that not infrequently the stage is elaborately set to conceal the fact of suicide. This is especially apt to be true when a man carrying heavy accident insurance, or recently insured under a policy with a suicide clause, and in serious financial straits, plans to take his own life in such a manner as to improve the financial position of his family. Tools may be scattered about, oil or grease applied to hands

or clothing, the hood of the car raised, and the body found in a position consistent with repair work or adjustment of some part of the motor.

Another difficulty which has arisen attaches to the use of the word 'poisoning' in connection with carbon monoxide deaths. The phrase 'carbon monoxide poisoning' has become fixed in medical parlance, but in a recent instance a Circuit Court Judge dismissed a case in which it was sought to secure compensation for a carbon monoxide death under an accident insurance policy in which there was a clause setting forth that no liability existed for death from poisoning. The deceased was found dead in his garage and the question of suicide was not raised by either party to the issue. Certainly the non-medical use of the term 'poisoning' in such a policy, and in all probability the understanding of it by both the vendor and purchaser, should not have been such as to exclude accidental death from inhalation of carbon monoxide from compensation. If such rulings stand unchallenged they will prevent compensation for a large group of undoubted accidents in which toxic agents are instrumental in producing injury and death. In the instance in question the trial judge was entirely satisfied by the fact that death had been certified to as due to carbon monoxide *poisoning*. Physicians may be forced to adopt some such circumlocution as 'death from inhalation of carbon monoxide'; and the phrase *asphyxia carbonica* is justified by long usage.

*SPONTANEOUS RUPTURE OF
THE SPLEEN IN INOCULA-
TION MALARIA*

While traumatic rupture of the spleen from falling from a height and from contusion and compression of the abdomen is relatively common, spontaneous rupture has always been a rare condition. It has been known to occur in typhoid fever, typhus, recurrent fever and occasionally in accidentally acquired malaria. All of these conditions have in common the possibility of a rapidly developing splenic tumor through congestion and lymphoid hyperplasia. In ordinary malaria, however, spontaneous rupture of the spleen is a very rare complication. It is said to have occurred but three times in 30,000 cases of malaria observed during the building of the Panama Canal. A number of authors leave the impression that in inoculation malaria for the treatment of paresis a splenic tumor seldom develops, but that splenic enlargement can occur and may be so marked as to produce spontaneous rupture has been shown by several cases. Jutz and Jacobi (*Münch. med. Wchenschr.*, 1931, lxxviii, 395-396) describe an example of this accident which they claim to be but the third to be reported as occurring in the course of the treatment of paresis in which there was no question of the spontaneous nature of the rupture. Their patient was a tabo-paretic, thirty-nine years old who had been inoculated with malarial blood twenty-three days before. He had reached his seventh cycle of a typical malaria, each with a fever of 104 degrees or above, when he suddenly went into a state of collapse with coma, pallor, rapid shallow

breathing and a feeble pulse which soon became imperceptible, death following within a few minutes. There had been no possibility of trauma. At autopsy a hemoperitoneum of two liters was found. Hemorrhage had occurred from a rupture of the greatly enlarged spleen, the tear reaching from the lower pole nearly to the hilus. After bleeding out, the spleen still weighed 540 grams. An entirely similar case came to autopsy in the Department of Pathology of the University of Michigan several years ago. This patient, under malaria treatment for tabo-paresis, had successfully completed thirteen chills during which the temperature ranged between 100 and 104 degrees. Following his fourteenth paroxysm he suddenly became dyspneic, vomited profusely and his pulse rose to 150, death following almost immediately. At autopsy the peritoneal cavity was found to contain over two liters of fluid blood and blood clot. The spleen weighed 580 grams and its upper pole was covered by a large mass of blood clot beneath which there was a rupture of the capsule and eversion of the soft pulp. When the rather limited application of malaria therapy is considered, it seems not unlikely that rupture of the spleen is more apt to occur in this group than in those having naturally acquired malaria. The reasons for this can only be surmised. It would be important to learn if those dying from rupture of the spleen in acquired malaria show a higher incidence of syphilis than the entire group from which they come. Can rupture of the malarial spleen in the syphilitic be attributed to changes in the supporting stroma, a loss of elasticity perhaps,

as part of that 'Derbheit' which gross pathologists recognized more than a generation ago? Or is the cause to be sought in cardio-vascular changes, due to which the splenic congestion of malaria is imposed upon a preceding con-

gestion of luetic origin? At any rate, the occasional occurrence of this accident is an added argument for investigating the efficacy in the treatment of progressive paralysis of other agents capable of inducing hyperpyrexia.

Abstracts

Occurrence of Numerous Large Giant Cells in the Tonsils and Pharyngeal Mucosa in Prodromal Stage of Measles. By ALDRED SCOTT WARTHIN. (Arch. of Path., 1931, xi, 864-874.)

This paper, which appeared posthumously, describes an entirely new histopathological feature of the prodromal stage of measles. In four instances, in the course of the examination of about 50,000 pairs of tonsils, there were found a subepithelial infiltration of multinucleate syncytial giant cells, lymphocytes and monocytes, wandering of the giant cells into the mucosa and on to its surface, with edema and congestion, marked lymphoid exhaustion of the germinal centers with production of the multinucleate giant cells from cells of the lymphoblast type and migration of these cells toward the mucosa. In the first patient, two days after tonsillectomy there was a temperature of 102.5° F., coryza, mild conjunctivitis and Koplik's spots. Two days later the fully developed eruption of measles was present. As a result of this experience, when similar giant cells were found subsequently in the tonsils of two other patients, the onset of measles was correctly predicted in advance of any clinical manifestations. In a fourth case, which had been examined without history four years before, a diagnosis of measles was then made, and enquiry brought the information that the patient developed measles on the day following tonsillectomy. These four pairs of tonsils were the only ones in the entire series which showed such giant cells and, as far as known, there were no other instances of prodromal measles in this material. Thus it appears that this pathology is so distinctive that a positive diagnosis of measles can be made from one to five days before the exanthem appears. The process is interpreted as a defensive one, indicating the presence of an etiologic agent, either in or on the pharyn-

geal mucosa, but the application of a large variety of staining methods failed to show micro-organisms either in the multinucleate giant cells or in neighboring structures.

Shadows Produced by Lead in the X-Ray Pictures of the Growing Skeleton. By EDWARD A. PARK, DEBORAH JACKSON and LASLO KAJDL. (Am. Jr. of Diseases of Child., 1931, vi, 485-499.)

It has been known for some time that the administration of phosphorus to growing children causes the freshly forming trabeculae at the ends of the shafts of the long bones to multiply and become closely packed together, thus producing a dense shadow. After the administration of phosphorus has been suspended for the proper length of time this shadow takes the form of a band which appears displaced toward the shaft since the most recently formed bone at the extremity of the shaft is less dense. In four cases of chronic lead poisoning studied by the authors similar shadows were found, although the bands were not so broad or so striking as those obtained by means of phosphorus. In two fatal cases in young children the shadows were narrow and intense. From this it might be inferred that the period of poisoning was relatively short and the amount of lead ingested large. In the third case the shadow was broad and extended to the cartilage which would indicate that the poisoning had continued to the time of the patient's admission to the hospital. The shadows in the bones in the fourth case were not as intense as the history might lead one to expect but their breadth (1 to 1.5 cm.) was in keeping with the known long duration of poisoning, and their position just under the cartilage was in accord with the fact that the eating of lead had continued up to the time when the pictures were taken. It is highly probable that the changes described can occur only in young and growing bone

and therefore will be the more strikingly developed, the younger the subject. The normal shadows in a child one or two years old or older must not be mistaken for those produced by lead.

The Localizing Significance of Impaired Respiratory Movements in Lesions of the Spinal Cord. By WALTER O. KLINGMAN. (Bull. of the Neurol. Institute, New York, 191, i, 136-144.)

Information of great value in localizing motor lesions involving the spinal cord may at times be obtained by careful observation of the action of the muscles of respiration. Due regard must be given to non-neurological affections in the thorax which might modify the action of the intercostal muscles and diaphragm. Five groups of variations which are of neurological import are recognized. The *first* group shows exaggerated lateral movements of both costal margins and includes the cases of paralysis of the diaphragm, such as may occur in poliomyelitis and other lesions of the second, third and fourth cervical segments due to syringomyelia, syringobulbia and occasionally infectious myelitis. In the *second* group the entire costal margin of one side moves farther and more promptly in a lateral direction. This indicates a paresis of the diaphragm on the involved side, such as may occur in syringomyelia, localized poliomyelitis and disease of the phrenic nerve. The *third* group exhibits a symmetrical movement of the costal margins of both sides toward the median line and is seen in transverse lesions of the lower cervical and upper thoracic cord, and to a less extent in low lesions of the thoracic cord which interfere with the innervation of the lower six intercostal and the posterior serratus muscles on both sides. The *fourth* group, in which the costal margin of one side moves toward the median line, results from paresis or paralysis of the lower intercostals on the involved side. The costal margin may flare laterally on the opposite side. This has been of value in determining the upper limit of the lesion in acute poliomyelitis. The *fifth* group shows, in addition to the exaggerated lateral

movements of the costal margins, an inspiratory retraction of the upper ribs and manubrium. This occurs with paralysis of the scaleni and upper intercostal muscles and has been observed in the terminal stages of myelitis.

The Specific Therapy of Pneumococcus Type I and Type II Pneumonia. By HORACE S. BALDWIN. (Am. Jr. Med. Sc., 1931, clxxxi, 788-796.)

During the four winters of 1926 to 1930 a controlled test of the value of specific therapy in pneumonias due to pneumococcus Type I and Type II has been conducted at the New York Hospital. Patients were assigned to two series in numerical sequence thus establishing an equivalent control group. The concentrated solution containing antibodies for Type I and Type II only, prepared according to the method of Felton, was used. The results were as follows:

Untreated Control Series			
Type	Cases	Died	Per Cent Mortality
I	20	5	
II	29	15	
	—	—	
	49	20	40.8
Treated Series			
Type	Cases	Died	Per Cent Mortality
I	19	1	
II	35	9	
	—	—	
	54	10	18.5

The administration of concentrated immune bodies to these patients was found to be relatively free from dangerous reactions and serum sickness, so that it was possible to give large amounts within a short time. The favorable clinical effect observed seemed to be due largely to the limitation of bacteremia. These results point to a definite advantage derived in specific therapy of Type II pneumonia, hitherto a discouraging procedure, when concentrates of high unit value are given in large amount.

Cinchophen Poisoning. By T. P. CHURCHILL and F. H. VAN WAGONER. (Proc. Soc. for Exp. Biol. and Med., 1931, xxviii, 581-582.)

When rapid cinchophen poisoning was induced in dogs by the administration of 27 times the human therapeutic dose, the animals refused to eat after from two to ten doses had been administered and died in from 9 to 20 days. The blood urea nitrogen first showed a marked rise, followed by a depression before death. The bromsulphalein test showed increased retention of the dye when the urea nitrogen decreased. In certain of the animals acute gastric ulcers were found at autopsy and all exhibited varying degrees of liver damage, from small areas of coagulation necrosis just beneath the capsule to complete disappearance of liver cells in small areas. Two dogs, which had been prepared 11 months before by the production of kidney damage by interference with the renal blood supply, were fed the usual human therapeutic dose of cinchophen, i.e., 22 mg. per kilo of weight. The urea nitrogen showed a slight rise, then a slight decrease as the bromsulphalein retention increased. The bromsulphalein test indicated an increasing retention with fluctuation in degree until two feedings were missed when a drop occurred. These dogs survived.

Age Incidence of Communicable Diseases in a Rural Population. By EDGAR SYDENSTRICKER and SELWYN D. COLLINS. (Public Health Reports, 1931, xlii, 100-113.)

The United States Public Health Service, with the cooperation of the Milbank Memorial Fund and the county health department has been conducting epidemiological studies in Cattaraugus County, New York, since 1929. The reports of certain communicable diseases for the preceding period, 1925 to 1929, have also been investigated. These data have been divided according to age, and also according to type of locality, as follows: (a) Cases occurring in Olean, a city of about 22,000; (b) in villages of not over a few hundred population; (c) among persons living on farms, designated as "rural." Measles, scarlet fever and whooping cough were the diseases investigated particularly. It was found that, with hardly an exception, the more rural the population, the higher were the ages at which these diseases occur. In the Olean group there was a marked tendency for a relatively high concentration of these diseases at the ages when children enter school, while in the rural group the risk of attack was more uniformly spread through the ages of childhood and adolescence, and the peak of the curve of incidence came distinctly later in childhood.

Reviews

Practical Treatise on Diseases of the Digestive System. By L. WINFIELD KOHN, M.D., F.A.C.P., Formerly Assistant in the Gastro-Intestinal Clinic, Johns Hopkins Hospital, Baltimore; Chief of the Clinic of Gastro-Enterology, Medico-Chirurgical College, Philadelphia, etc.; Present Chief of the Gastro-Intestinal Clinic, Lebanon Hospital, New York City, etc. Two volumes, xx + 574, and x + 555 (575 to 1,125) pages, 542 illustrations including 7 colored plates. F. A. Davis Company, Philadelphia, 1930. Price for two volumes, \$12.00 net.

Until one surveys the field of essential subject matter that must be included in a treatise on diseases of the digestive system there can be but little realization of the task which confronts the author who attempts such a work. The reviewer might be inclined to be critically disposed when he finds in the present work but a page given over to typhoid fever and only a line to acute poisoning with lead, mercury and arsenic, did he not realize that the entire range of diseases of the alimentary tract, from xerostomia, through the avitaminous diseases to carcinoma of the rectum and hemorrhoids was clamoring for representation. The first chapter is a brief presentation of anatomy of the digestive system, while the second covers the physiology of digestion in 64 pages. The eight chapters which follow give the methods of clinical approach and investigation. Here roentgenological methods receive the most complete discussion, with nearly 100 pages devoted to this division. The author's interest in intragastric photography is shown by a detailed description of the gastro-photor and its uses. Nine pages are given over to reproduction of such photographs. The diseases of the various portions of the digestive system are next taken up in anatomical order and the second volume is brought to a close with chapters

dealing with gastro-intestinal parasites, gastro-intestinal symptoms produced by diseases of other organs, dietary considerations, therapeutic considerations, and a brief discussion of surgery of the gastro-intestinal tract. Brief bibliographies are added to many chapters. This work is very well printed, containing remarkably few typographical errors for a first edition and the division into two volumes adds greatly to convenience in handling. This practical treatise will appeal primarily to physicians engaged in general medicine.

Abdomino-Pelvic Diagnosis in Women. By ARTHUR JOHN WALSCHEID, M.D., Director of Obstetrical and Gynecological Department of Pan-American Medical Center and Clinics, New York City; Consultant in Gynecology and Obstetrics to Margaret Hague Maternity Hospital, Jersey City, N.J.; Consulting Gynecologist to Bergen County Hospital, Ridgeway, N. J.; Consulting Gynecologist to F. Reuter Home, North Bergen, N. J. xxiii + 1,000 pages, 397 illustrations and one color plate. The C. V. Mosby Company, St. Louis, 1931. Price, \$12.50.

This work deviates considerably from the usual style of treatises on gynecology. It is strictly limited to the diagnostic field and omits detailed descriptions of normal physiology and anatomy on the one hand, and of operative procedures on the other. It develops the subject along broad anthropologic lines, the author freely acknowledging his debt to Professor Jayles' *Morphology of the Human Female* for this portion of his material. Throughout the entire book this interest in the biological and particularly the psychological phases is apparent. Perhaps the bread-and-butter gynecologists, if there are such, will be disappointed in this method of treatment, for the book must be read with understanding to be appreciated.

The first four chapters, 351 pages, deal with general gynecology; the remainder of the work in ten chapters treats special gynecology, taking up the respective disease conditions in order as determined by anatomical considerations. This section of the book gives less space, relatively, to some of the common, well understood, diseases; and is especially valuable for the completeness with which the less common conditions are treated. The pathologic interpretations are sound and in accordance with the best opinion. A more extended review of this work would be inappropriate for the *ANNALS*. It merits the fullest approval and is especially commended to those who believe that Medicine is, after all, a biological science.

The Treatment of Asthma. By A. H. DOUTHWAITE, M.D., F.R.C.P. (Lond.), Assistant Physician, Guy's Hospital; Physician in Charge of Massage Department, Guy's Hospital. viii + 164 pages. William Wood and Company, New York, 1931. Price, \$2.50, net.

The preface of this book states that it is hoped that it presents in an assimilable form all facts and theories of practical importance which are relevant to the subject. Most readers will feel that it falls far short of this goal. One is not led to expect a scientific approach as he reads in the first chapter that the practice of classifying asthmatics according to the apparent etiology or exciting factors is confusing and that such a process really does little to clarify the situation. However, the author does classify causes and his presentation gains thereby. The information presented includes practically none that is new and a bibliography of but 46 items furnishes the list of sources quoted. The discussion of treatment and of the results of treatment is restrained and well balanced. The author is to be commended for his conservatism in refusing to be carried away by any one procedure. Judged by American standards and fashions, this book (printed in Great Britain) is cheaply and unattractively produced. The American purchaser will feel that in respect to both format and content it is overpriced.

Physics of Radiology. By J. L. WEATHERWAX, M.A., Physicist Philadelphia General Hospital, Associate in Radiotherapeutic Physics, University of Pennsylvania Graduate School of Medicine. 126 illustrations. xviii + 240 pages. Paul B. Hoeber, Inc., New York, 1931. Price, \$5.00.

The older radiologists were able to keep abreast of the development of their subject as their knowledge grew with it in the course of its evolution. For the student who is now entering upon this field of work, the physical problems are far more complex and diversified and the apparatus much more complicated. Without going too deeply into general physics, electricity and mathematics, this textbook presents the necessary information for an understanding of the principles of radiology, the construction of type forms of apparatus, and the general theory of dosage. Thirty-two tables of various constants and other useful information are introduced. The student will find this book of great value in establishing a sound basis of knowledge of the subject. More liberal use of references to the more advanced literature would have been of advantage to the student seeking authority for some of the material presented. The press work is excellent and the binding neat and practical.

Roentgen Interpretation: A Manual for Students and Practitioners. By GEORGE W. HOLMES, M.D., Roentgenologist to the Massachusetts General Hospital and Assistant Professor of Roentgenology, Harvard Medical School, and HOWARD E. RUGGLES, M.D., Roentgenologist to the University of California Hospital and Clinical Professor of Roentgenology, University of California Medical School. Fourth edition, revised; xii + 339 pages; 237 illustrations. Lea and Febiger, Philadelphia, 1931. Price, \$5.00, net.

In the interpretation of roentgen pictures, as in the diagnosis of tissue sections, a judgment cannot be made by direct comparison with other pictures or with other slides. Yet such illustrative material may be of very great aid. Pathological processes may never be duplicated in respect to all minute details, but they always follow gen-

eral laws. The authors of this manual have wisely emphasized these principles both in their prefatory advice and in the use of a large number of well chosen illustrations. The first chapter is given over to a brief discussion of confusing shadows and artefacts and the second to anatomical variations and rate of development, with tables giving the time of appearance of the various centers of ossification. This is followed by the pathology of the bones and joints, of the organs of the chest, gastro-intestinal tract and genito-urinary tract. The final section is on fluoroscopic technic. The book is fairly well indexed. The treatment of certain subjects seems inadequate in view of their relative importance. Bronchogenic carcinoma, for instance, is disposed of in one-half page and the discussion starts with the usual statement of the preceding generation of texts, that 'primary malignancy of the lung is rare.' On the whole, however, this book can be heartily recommended. Its careful reading cannot be other than stimulating to the young roentgenologist and to the general practitioner.

Practical Radiation Therapy. By IRA I. KAPLAN, B.S., M.D., Director, Division of Cancer, Department of Hospitals, New York City; Attending Radiation Therapist, Bellevue Hospital; Lecturer in Radiation Therapy, New York University and Bellevue Hospital Medical College; Director, New York City Cancer Institute: with a chapter on *Applied X-Ray Physics* by CARL B. BRAESTRUP, B.Sc., P.E., Radiation Physicist, Division of Cancer, Department of Hospitals, New York City; Physicist to Mt. Sinai Hospital, New York City. 354 pages; 227 illustrations. W. B. Saunders Company, Philadelphia and London, 1931. Price in cloth, \$6.00.

Chapters on the history, definition and action, and production of x-rays and radium form the introductory material of this book. The last mentioned chapter contains numerous interesting photographs, which are not, however, apropos to the main thesis of the book. Applied x-ray physics then furnishes the necessary background for the discussion

of dosage. The remainder of the book is a description of radiation therapy as practiced at Bellevue Hospital. This portion is excellently illustrated and the pictures are largely left to tell their own story as to the various devices to be employed. The reader must constantly bear in mind that this book is not a guide as to *what* method of treatment is to be used in a particular disease condition, but *how* radiation therapy is to be employed provided it is the method of choice. There are many diseases listed, each with its radiotherapeutic procedure, which most physicians would elect to treat by other methods. Such are salpingitis, gingivitis, glandular hypertrophy of the thyroid, pertussis, asthma, vernal catarrh and nasal polypi. One is prone to wonder what pathologic entity was intended when reference is made to a benign fatty tumor of the thyroid (p. 220). This book is well printed; the illustrations are effective. It is sure to be useful to all who are interested in the technical application of radiation therapy.

Microbiology and Elementary Pathology for the Use of Nurses. By CHARLES G. SINCLAIR, B.S., M.D., Major, Medical Corps, U. S. Army, Instructor in Bacteriology, Army Medical School; Instructor in Microbiology and Pathology, Army School of Nursing, Washington, D. C. 362 pages; 102 illustrations, some in colors. F. A. Davis Company, Philadelphia, 1931. Price, \$2.50, net.

The author's experience in instructing student nurses has aided him in selecting for this textbook the essential material and in presenting it in an unusually clear, simple and concise manner. Microbiology occupies 206 pages; Laboratory Exercises in Microbiology, 20 pages; and Elementary Pathology, 103 pages. The last section is perhaps not quite as successful as the others; as it is also the most difficult to present simply to nurses. In each division much skill is shown in the gradual building up of the necessary technical vocabulary, and the presentation is aided by the many well chosen illustrations. This should prove to be a very useful and satisfactory book for the field for which it is intended.

College News Notes

ABSTRACT OF MINUTES OF THE MEETING OF THE BOARD OF REGENTS, Philadelphia, Pa., June 9, 1931.

The Board of Regents of the American College of Physicians met at the College Headquarters in Philadelphia, June 9, 1931, with the following present: President S. Marx White, Drs. David P. Barr, Walter L. Bierring, Charles G. Jennings, Clement R. Jones, James S. McLester, James H. Means, James Alex. Miller, Sydney R. Miller, John H. Musser, O. H. Perry Pepper, George Morris Piersol, Maurice C. Pincoffs, Francis M. Pottenger, and Mr. E. R. Loveland, Executive Secretary.

President S. Marx White spoke briefly about College affairs, referring especially to the death of Dr. Aldred Scott Warthin, and the necessity of action by the Board of Regents in providing for the future continuation of the journal, *ANNALS OF INTERNAL MEDICINE*.

The Executive Secretary reported the deaths of nine members since the preceding Regents' meeting, presented special cases requiring action by the Board in respect to fees and dues, and reported in detail the gifts of books and publications presented to the College Library by members, etc. A resolution was adopted providing that Dr. Donald J. Frick, of Los Angeles, and Dr. John E. Heatley, of Oklahoma City, should be reinstated as Fellows of the College.

Upon the report of the death of Dr. Reynold Webb Wilcox on June 6, 1931, the following resolution was adopted:

RESOLVED, that the Secretary-General should be instructed to draw up a proper resolution concerning Dr. Reynold Webb Wilcox, in recognition of his being the first President of the American College of Physicians.

Upon report of the death of Dr. Aldred Scott Warthin on May 23, 1931, in recognition of his eminent contributions to the College through the Editorship of the Journal, the following resolution was adopted:

RESOLVED, that a Committee be appointed to draw up a suitable resolution concerning Dr. Aldred Scott Warthin for publication in the *ANNALS OF INTERNAL MEDICINE*.

Dr. George Morris Piersol, Chairman of the Committee on Credentials, presented the report of his Committee, recommending the election of the following named candidates, who, upon resolution regularly adopted, were elected Fellows of the College.

(The following list is arranged geographically with respect to the candidates elected. Under each candidate's name are listed (1) name of proposer; (2) name of second; and (3) name of endorser).

CALIFORNIA

San Francisco

- Stacy Raymond Mettier
1. William J. Kerr
2. Ernest H. Falconer
3. Hans Lissner

COLORADO

Denver

- Matthew A. Spangelberger
1. P. J. Pothuisje
2. T. R. Love
3. J. N. Hall

DISTRICT OF COLUMBIA

Washington

- Frederick Ceres (M.C., U.S.N.)
1. Joel J. White
2. F. F. Murdoch
3. William Gerry Morgan
and
Charles E. Riggs
Robert Copeland Mooney
1. David O. Smith
2. Philip B. Matz
3. William Gerry Morgan

FLORIDA

Jacksonville

- Clayton Elbert Royce
 1. William W. Kirk
 2. R. H. McGinnis
 3. T. Z. Cason

Lake City

- Harold Foor Machlan
 1. Louis Hamman
 2. Sydney R. Miller
 3. T. Z. Cason

GEORGIA

Atlanta

- Millard Everingham Winchester
 1. Joe P. Bowdoin
 2. T. F. Abercrombie
 3. Allen H. Bunce
 and
 Russell H. Oppenheimer

Macon

- Fred Leland Webb
 1. M. A. Clark
 2. Allen H. Bunce
 3. Russell H. Oppenheimer

Millen

- Guy George Lunsford
 1. Joe P. Bowdoin
 2. T. F. Abercrombie
 3. Allen H. Bunce
 and
 Russell H. Oppenheimer

Savannah

- J. Reid Broderick
 1. Lee Howard
 2. Ralston Lattimore
 3. Russell H. Oppenheimer

ILLINOIS

Rockford

- Robinson Bosworth
 1. Clarence H. Boswell
 2. Anna Weld
 3. James G. Carr

IOWA

Council Bluffs

- Aldis Adelbert Johnson
 1. John H. Peck
 2. A. C. Page
 3. Tom B. Throckmorton
 and
 Walter L. Bierring

Des Moines

- John Thomas Strawn
 1. A. C. Page
 2. John H. Peck
 3. Tom B. Throckmorton
 and
 Walter L. Bierring

Independence

- Judd Campbell Shellito
 1. Elmer G. Senty
 2. John I. Marker
 3. Walter L. Bierring

Mason City

- Lee Roy Woodward
 1. Daniel J. Glomset
 2. John H. Peck
 3. Tom B. Throckmorton
 and
 Walter L. Bierring

KENTUCKY

Louisville

- Hugh Rodman Leavell
 1. C. W. Dowden
 and
 William E. Gardner
 2. Charles G. Lucas
 and
 J. Rowan Morrison
 3. Ernest B. Bradley

MARYLAND

Baltimore

- Ernest Howard Gaither
 1. Thomas R. Brown
 2. Sydney R. Miller
 3. Henry M. Thomas, Jr.

MASSACHUSETTS

Boston

- James Morison Faulkner
 1. George R. Minot
 2. Soma Weiss
 3. Roger I. Lee
 Harry Winfred Goodall
 1. Maurice Fremont-Smith
 2. William B. Breed
 3. James H. Means
 and
 Roger I. Lee
 Francis Cooley Hall
 1. William B. Breed
 2. Maurice Fremont-Smith
 3. Roger I. Lee

Howard Burnham Sprague

1. Paul D. White
2. William B. Breed
3. J. H. Means
and
Roger I. Lee

Brookline

Walter Bauer

1. Dwight L. Siscoe
2. Chester M. Jones
3. J. H. Means
and
Roger I. Lee

NEW HAMPSHIRE

Manchester

Hetnry W. N. Bennett

1. Robert B. Kerr
2. Louis O. S. Wallace
3. Edward O. Otis

NEW JERSEY

Asbury Park

Joseph H. Bryan

1. Clarence M. Trippe
2. James J. McGuire
3. W. Blair Stewart

Freehold

Warren H. Fairbanks

1. Clarence M. Trippe
2. William G. Herrman
3. W. Blair Stewart

Union City

Charles Vincent Niemeyer

1. Abraham E. Jaffin
2. Eugene J. Luippold
3. W. Blair Stewart

NEW YORK

New York

Walter Palmer Anderton

1. Frank Bethel Cross
2. W. W. Herrick
3. James Alex. Miller
and

Luther F. Warren

Robert Chobot

1. Luvia M. Willard
2. Robert A. Cooke
3. James Alex. Miller
and
Luther F. Warren

Isidore William Held

1. Harlow Brooks
2. I. Seth Hirsch
3. Luther F. Warren

Samuel Waldron Lambert

1. Warren Coleman
2. Harlow Brooks
3. Luther F. Warren

Josephine Bicknell Neal

1. Luvia M. Willard
2. Harlow Brooks
3. James Alex. Miller
and

Luther F. Warren

Willard Cole Rappleye

1. Luther F. Warren
2. James Alex. Miller
3. Walter L. Bierring

Poughkeepsie

Scott Lord Smith

1. W. W. Herrick
2. Frank J. Sladen
3. Harlow Brooks

Richmond Hill

Frank J. Weigand

1. Ernest E. Keet
2. Luvia M. Willard
3. James Alex. Miller
and

Harlow Brooks

NORTH CAROLINA

Raleigh

Hubert Benbury Haywood

1. William de B. MacNider
2. William B. Dewar
3. C. H. Cocke

Winston-Salem

Wingate Memory Johnson

1. Thurman D. Kitchin
2. L. B. McBrayer
3. C. H. Cocke

OHIO

Cincinnati

Mark Atkins Brown

1. Roger S. Morris
2. William L. Freyhof
3. James S. McLester
and
A. B. Brower

PENNSYLVANIA

Philadelphia

James Craig Small

1. Frank Walton Burge
2. Robert G. Torrey
3. E. J. G. Beardsley

Pittsburgh

George Jacob Kastlin

1. Ellis M. Frost
2. C. Howard Marcy
3. E. Bosworth McCready

WEST VIRGINIA

Morgantown

George Ralph Maxwell

1. Edward J. Van Liere
2. Martin L. Bonar
3. John N. Simpson

WISCONSIN

Milwaukee

Roy Wilmot Benton

1. Theodore L. Squier
2. John Huston
3. Rock Sleyster

CANADA

Ontario

Toronto

George Chambers Anglin

1. W. E. Ogden
2. A. H. Caulfeild
3. Jabez H. Elliott

Quebec

Montreal

Colin George Sutherland

1. C. F. Martin
2. R. H. M. Hardisty
3. S. Sclater Lewis

Henry Pulteney Wright

1. C. F. Martin
2. Arthur T. Henderson
3. D. Sclater Lewis

Dr. Clement R. Jones, Treasurer, presented a trust agreement between the American College of Physicians and the Bank of Pittsburgh National Association, providing a means of the bank acting as trustee of the securities of the American College of Physicians, in accordance with a resolution adopted during the Baltimore Clinical Ses-

sion in March. The College has set aside \$50,000 as the nucleus for an Endowment Fund, to which shall be added direct subscriptions for Life Membership, gifts of funds, and bequests in connection with estates. The principal shall be kept intact, and invested in bonds approved by the Board of Regents. By resolution, the Secretary-General, Dr. George Morris Piersol, and the Treasurer, Dr. Clement R. Jones, were instructed to complete the trust agreement with the Bank of Pittsburgh National Association, in accordance with directions and recommendations made by the Board of Regents.

New regulations for the John Phillips Memorial Prize, as printed below, were reviewed, and the following Committee appointed and instructed to proceed in accordance therewith:

James H. Means, Chairman, Boston, Mass.

David P. Barr, St. Louis, Mo.

James S. McLester, Birmingham, Ala.

Jonathan C. Meakins, Montreal, Que.

John H. Musser, New Orleans, La.

Revised Regulations

JOHN PHILLIPS MEMORIAL PRIZE

- I. (a) Interpretation of Internal Medicine—This term should include not only Clinical Science, but, in addition, all those subjects which have a direct bearing upon the advancement of Clinical Science;
- (b) The work upon which this is based must have been done in whole or in part in the United States or Canada.
- II. Not less than two or more than three members of the Committee should be reappointed each year;
- III. (a) The Committee shall appoint Fellows of the College who shall each maintain a close contact with a particular field of the realm of Medical Science and shall report to the Committee any specially meritorious work which has been accomplished in this field;

- (b) If considered necessary or desirable the Committee may appoint a small Board of Referees to visit (at the expense of the College) a particular investigator whose work appears to be of sufficient merit, in order that a first-hand opinion may be obtained by competent observers.
 - (c) The Committee, after due consideration of the reports submitted by the above appointed Fellows and Referees, may select a recipient or recipients for the Prize and should inform the President of their choice at least two months before the date of the Annual Meeting.
 - (d) The College reserves the right to make no award of the Prize if a sufficiently meritorious piece of work has not been recommended.
- IV. The recipient of the Prize will be expected to file with the College a written account of his work and to present his results as a paper before the next Annual Meeting after which he will be officially presented with the Prize by the President.
- V. (a) The announcement of the Prize-Winner will be made not later than two months before the Annual Meeting of the College.
- (b) The Executive Secretary shall inform the recipient of the Prize that the College would be pleased to defray his transportation expenses when he attends the Annual Meeting to receive the Prize.

President White reported upon arrangements being made for the General Program of the San Francisco Clinical Session to be held April 4-8, 1932. As President of the College, Dr. White is responsible for the preparation of the program of the General

Scientific Sessions. Dr. White reported that he had asked Dr. William J. Kerr, of San Francisco, Dr. Noble Wiley Jones, of Portland, and Dr. F. M. Pottenger, of Monrovia, in conjunction with other men, to act as an Advisory Committee and give names of the men from the far West whose work is desirable for presentation. As a result, a large amount of excellent material has been offered and will be used to make up a considerable proportion, less than half, of the program for the General Sessions in San Francisco next April. Dr. White reported that he has planned, as a feature of the General Program, a scientific presentation of the sympathetic nervous system. The Board of Regents authorized him to invite some outstanding foreign guest on this subject, the name of Dr. Dale, of London, being prominently mentioned.

Dr. F. M. Pottenger reported that all local arrangements have been made for the San Francisco meeting by Dr. Kerr and his several Committees, and that Dr. Kerr, as General Chairman, expects to have the complete program of clinics ready to submit in late August or early September. Dr. Pottenger also referred to a program of entertainment which the members of the College in Southern California, especially around Los Angeles, are arranging after the San Francisco Session.

Mr. E. R. Loveland, Executive Secretary, reported that he had made a trip to San Francisco and Los Angeles, in accordance with directions of the Regents, and that he, with the assistance of Doctors Pottenger and Kerr, had completed business arrangements for the 1932 Clinical Session. The Palace Hotel has been selected not only for hotel headquarters, but for general headquarters for registration, general scientific sessions, exhibits, etc. Railroad fares on the Certificate Plan of reduced rates will apply to all physicians and members of their families attending the Session. A special train will be operated from the East through to San Francisco, leaving there immediately after the Session taking members through the Yosemite Valley to Los Angeles and thence by way of the Grand Canyon back East. It is anticipated that the reduced fares will entitle members to optional return routes.

The Executive Secretary reported that the 1931-1932 Directory of the College will be ready for distribution about September 1.

President White paid tribute to the late Dr. Warthin by saying in part, "Dr. Warthin's service to the College has been such an outstanding one, his Editorship of the Annals has been so acceptable and the Annals has been taking such a prominent place in Medical literature that his death leaves a serious loss."

A special Committee consisting of Dr. S. Marx White, Dr. George Morris Piersol and Dr. David P. Barr was appointed with instructions to function immediately with respect to carrying on the Annals, to survey the situation with respect to a new Editor and an Editorial Board, to make recommendations concerning the manner in which the Journal should be managed, and to bring back recommendations to the next meeting of the Board of Regents.

Upon motion by Dr. Maurice C. Pincoffs, seconded by Dr. David P. Barr, and regularly carried, it was

RESOLVED, the President shall appoint a Committee on Public Relations to which shall be referred all matters affecting the College or the medical profession in its relation to the public. This Committee shall report its recommendations to the Board of Regents for approval or action. The Committee shall consist of four members with the President a member ex officio; the terms of office shall be so arranged that one new member shall be appointed each year, with a maximum term of four years.

President White appointed the following Committee on Public Relations:

Charles G. Jennings, Chairman.....	4 years
Walter L. Bierring.....	3 years
James Alex. Miller.....	2 years
W. Blair Stewart.....	1 year
S. Marx White (President, ex officio)	
Adjournment.	

DOCTOR ALFRED STENGEL

Dr. Alfred Stengel (Master), Philadelphia, was appointed Vice President of the University of Pennsylvania, in charge of medical affairs, at the annual Commencement of that institution on June 17. Through Dr.

Stengel's appointment, the University of Pennsylvania plans a coordination of all the existing schools and departments included in the medical, dental, hygiene, veterinary and physical educational work. This will embrace the University of Pennsylvania School of Medicine, the Graduate School of Medicine, the Phipps Institute, the Wistar Institute, the University Hospital, Graduate Hospital, the Orthopedic Hospital and the Institute of Mental Health of the Pennsylvania Hospital.

Dr. Stengel is a graduate of the University of Pennsylvania School of Medicine, and has been connected with the medical faculty since 1893. He is at present Professor of Medicine, both in the School of Medicine and in the Graduate School of Medicine; he is a term trustee of the University of Pennsylvania, a member of the Trustees' Executive Board, a member of the Trustees' Board of Medical Affairs, and a member of the Managing Committee of the University of Pennsylvania Fund. On the occasion of the 165th anniversary of the founding of the School of Medicine last year, Dr. Stengel was awarded the honorary degree of Doctor of Laws. He also holds the degree of Doctor of Laws from Lafayette College and the degree of Doctor of Science from the University of Pittsburgh.

Dr. Stengel was President of the American College of Physicians for two successive years, 1925-1926 and 1926-1927. He has rendered distinguished service to the College for many years, and was made a Master during the Boston Clinical Session in 1929.

Announcement is made of the prospective organization of an Association among those seeking post-graduate courses in Medicine given in English in Berlin. With this Association the present Dozentenverein of the University of Berlin will cooperate. The general plan contemplates an organization similar to the well-known American Medical Association of Vienna. Inquiries and applications may be addressed to the organizing secretary, Miss Anny Engel, whose present address is Vienna I, Bösendorferstrasse 6, Austria.

COLLEGE LIBRARY OF PUBLICATIONS BY
MEMBERS

Members of the College are urged to contribute copies of books of which they are authors or co-authors to the College Library. The following Fellows recently contributed the books named:

Dr. James S. McLester (Fellow), Birmingham, Ala.:

"Nutrition and Diet in Health and Disease"

Dr. Bernard L. Wyatt (Fellow), Tucson, Ariz.:

"Chronic Arthritis and Rheumatoid Affections"

Dr. Edwin Henes, Jr. (Fellow), Milwaukee, Wisc.:

"Minneapolis Proceedings of the Interstate Postgraduate Medical Association of North America"

In addition to the above gifts, acknowledgment is made of the receipt of a considerable number of reprints, from the following members:

Dr. Jacob M. Cahan (Fellow), Philadelphia, Pa.—8 reprints;

Dr. Gustave P. Grabfield (Fellow), Boston, Mass.—20 reprints;

Dr. A. Morris Ginsberg (Fellow), Kansas City, Mo.—1 reprint;

Dr. Earle E. Mack (Associate), Syracuse, N. Y.—1 reprint;

Dr. Philip B. Matz (Fellow), Washington, D. C.—2 reprints;

Dr. Carl V. Vischer (Fellow), Philadelphia, Pa.—1 reprint;

Dr. Joseph R. Darnall (Fellow), Riverdale, Md.—1 reprint;

Dr. George R. Minot (Fellow), Boston, Mass.—13 reprints;

Dr. Aaron E. Parsonnet (Fellow), Newark, N. J., with Dr. Albert S. Hyman (Fellow), New York, N. Y.—4 reprints;

Dr. William D. Reid (Fellow), Boston, Mass.—2 reprints;

Dr. John M. Swann (Fellow), Rochester, N. Y.—19 reprints;

Dr. C. F. Tenney (Fellow), New York, N. Y.—3 reprints;

Dr. Robert A. C. Wollenberg (Fellow), Detroit, Mich.—1 reprint;

Dr. Bernard L. Wyatt (Fellow), Tucson, Ariz.—5 reprints.

At the 64th annual meeting of the West Virginia State Medical Association, held at Clarksburg, May 19-21, contributions were made to the program by the following members of the College:

Dr. Sydney R. Miller (Fellow), Baltimore, Md.—"Arthritis";

Dr. W. H. Mayer (Fellow), Pittsburgh, Pa.—"The Nervous Patient and the General Practitioner";

Dr. John N. Simpson (Fellow), Morgantown, W. Va.—"What the Medical Department of West Virginia University Has Accomplished Since its Inception";

Dr. Howard T. Phillips (Fellow), Wheeling, W. Va.—"Ringworm Infection of the Hands, Feet and Groins";

Dr. Albert H. Hoge (Fellow), Bluefield, W. Va.—"Hypothyroidism as a Cause of Chronic Infection";

Dr. Ray C. Blankinship (Fellow), Madison, Wis.—"Medical Aspects of Jaundice";

Dr. G. H. Barksdale (Associate), Charleston, W. Va.—"Oration on Medicine."

Dr. James B. Herrick (Fellow), Chicago, delivered the Abner Welborn Calhoun Lecture on "Common Errors in the Treatment of Heart Disease" at the eighty-second annual session of the Medical Association of Georgia, held at Atlanta, May 12-15.

Dr. William Gerry Morgan (Fellow), Washington, D. C., President of the American Medical Association, also delivered an address.

Col. Charles R. Reynolds (Fellow), Carlisle Barracks, Pa., delivered the chief address on field training for medical officers at the annual conference of the medical subchapter of the Cook County (Ill.) Chapter of the Reserve Officers Association, U. S. Army, at Chicago, on May 18.

Dr. Benjamin Goldberg (Fellow), Chicago, has resigned as Medical Director of

the Chicago Municipal Tuberculosis Sanitarium.

Dr. Thomas Addis (Fellow), Professor of Medicine, Stanford University Medical School, San Francisco, delivered the fourth course of lectures under the William Sydney Thayer and Susan Read Thayer Lectureship in Clinical Medicine in the School of Hygiene and Public Health of the Johns Hopkins University School of Medicine, Baltimore, May 11 and 12. The title of his first lecture was "The Natural History of Glomerular Nephritis," and the second lecture, "Questions in Connection with the Prognosis, Treatment and Etiology of Glomerular Nephritis."

Dr. James B. Bullitt (Fellow), Chapel Hill, N. C., delivered the annual oration on "State Medicine" before the sixty-fourth annual meeting of the Mississippi State Medical Association, held at Jackson, May 12-14.

Dr. Edward O. Otis (Fellow), Exeter, N. H., was the recipient of a gold medal for fifty years of membership in the New Hampshire State Medical Association at its annual meeting in Manchester, May 19-20. Dr. Otis has long been an enthusiastic, influential and active worker in New England medical organizations, as well as in many national societies.

Dr. William Gerry Morgan (Fellow), Washington, D. C., delivered two addresses during the New Hampshire Medical Society's annual meeting.

Dr. Paul D. White (Fellow), Boston, and Dr. George Blumer (Fellow), New Haven, were also guest speakers, their titles being "Significance and Treatment of Cardiac Symptoms and Signs" and "Coronary Occlusion and Angina Pectoris," respectively.

The following Fellows contributed articles indicated in the June Issue of the American Journal of the Medical Sciences:

Dr. James H. Means (Fellow), Boston, Mass. (with Lerman)—"Iodine in Exophthalmic Goiter. A Comparison of the

Effect of Ethyl Iodide and Potassium Iodide with that of Lugol's Solution";

Dr. Louis P. Hamburger (Fellow), Baltimore, Md.—"Head Murmurs."

Dr. I. S. Trostler (Fellow), Chicago, recently addressed the LaPorte County (Ind.) Medical Society.

Dr. Trostler also presented a paper on "Roentgenotherapy in Benign Diseases" before the Illinois State Medical Society at East St. Louis, Ill., on May 6; a paper entitled "A Few Interesting X-Ray Findings with Clinical Summaries" before the North Side Branch of the Chicago Medical Society, May 14, and a paper on "Reports on Roentgen Findings" before the Section on Radiology of the American Medical Association at Philadelphia on June 11.

Dr. Maximilian J. Hubeny (Fellow), Chicago, recently officiated as Toastmaster at the banquet of the Wisconsin State Medical Society, Section on Radiology, at Milwaukee.

The Radiological Society of North America will hold its 17th annual meeting at the New Jefferson Hotel, St. Louis, Mo., November 30 to December 5, 1931.

Dr. Edwin C. Ernst (Fellow), St. Louis, acted as Secretary of the American Delegation to the Third International Congress on Radiology, which was held in Paris during July.

Dr. Benjamin H. Orndoff (Fellow), Chicago, presented a paper on "The Treatment of Breast Carcinoma" before the Section on Radiology of the Illinois State Medical Society's meeting on May 7.

Dr. Harold Swanberg (Fellow), Quincy, Ill., is Secretary of the Secretaries' Conference of the Illinois State Medical Society.

Dr. Louise Tayler-Jones (Fellow), Washington, D. C., is Vice President of the Medical Women's International Association, which represents twenty-two countries. Dr.

Tayler-Jones will attend the next meeting of this organization in Vienna during September.

Dr. Elizabeth Bass (Fellow), New Orleans, La., Dr. Martha Tracy (Fellow), Philadelphia, and Dr. Louise Tayler-Jones (Fellow), Washington, D. C., each contributed articles to the March issue of the Medical Review of Reviews.

Dr. Arthur Bloomfield (Fellow) and Dr. Walter W. Boardman (Fellow), both of San Francisco, Calif., presented a very interesting clinic on gastro-intestinal diseases before the California Medical Association's meeting in May.

Dr. Clyde Brooks (Fellow) has resigned as Professor of Physiology and Chairman of Research at the University of Alabama to accept an appointment as Head of Physiology and Pharmacology of the new medical center which is being developed on the campus of Charity Hospital, New Orleans, under the auspices of the Louisiana State University.

The new medical school, at the beginning, will have a first year and a third year class of medical students opening this autumn. Dr. Aristides Agramonte, of Havana, has accepted the appointment as Head of the Department of Tropical Diseases.

Dr. Grafton Tyler Brown (Fellow) and Dr. Oscar B. Hunter (Fellow), Washington, D. C., were contributors to the Allergy Exhibit at the Philadelphia meeting of the American Medical Association. Their contribution consisted of an exhibit of fungi (molds and yeasts) in relation to allergic conditions.

Dr. Brown presented a paper on "Maximum Dosage in Pollen Therapy" at the Ninth Annual Meeting of the Association for the Study of Allergy in Philadelphia on June 9.

Dr. Louis H. Clerf (Fellow), Philadelphia, was the Campbell Lecturer of the Fayette County Medical Society at Uniontown, Pa., May 19.

Dr. Clerf also participated in the week

of graduate instruction given by the Medical School of the University of Michigan at Ann Arbor, lecturing the entire day of May 20.

Dr. Harold S. Davidson (Fellow), Atlantic City, N. J., made the address of welcome to the American Therapeutic Society's meeting in Atlantic City, June 5-6.

Dr. Clement R. Jones (Fellow), Pittsburgh, Pa., is President; Dr. Grafton Tyler Brown (Fellow), Washington, is Secretary, and Dr. Truman G. Schnabel (Fellow), Philadelphia, is Treasurer.

Dr. Joseph C. Doane (Fellow), Associate Professor of Medicine, Temple University of Philadelphia, and Associate Professor of Medicine, Graduate School of Medicine, University of Pennsylvania, recently spoke before a joint meeting of the Fifth Councillor District of the State Medical Society of New Jersey and the Atlantic County Medical Society at Atlantic City, N. J., on the subject "What the Public Thinks of the Present Day Practice of Medicine"; Dr. Doane addressed the Philadelphia College of Physicians recently on "Some Observations on the Study of the Results of One Hundred and Seventy-five Post Mortem Examinations"; and again the Atlantic County Medical Society, May 8, on "Diseases of the Endarteries."

Dr. Benjamin Hobson Frayser (Fellow) has recently been transferred from the U. S. Veterans' Hospital at Fort Harrison, Mont., to the U. S. Veterans' Hospital at Lexington, Ky.

Dr. Harry Gauss (Fellow), Denver, Colo., addressed the Medical Society of the City and County of Denver, May 18, on "The Etiology and Management of Chronic Diarrhea."

The C. V. Mosby Company, of St. Louis, has recently published his book on "Clinical Dietetics."

Among contributors to the program of the Illinois State Medical Society's meeting at East St. Louis in May, the following

Fellows, not previously mentioned, are included:

Dr. Andrew C. Ivy (Fellow), Chicago—"Facts Concerned in Gall Bladder Evacuation";

Dr. Nathan S. Davis, III (Fellow), Chicago, Secretary of the Chicago Medical Society—"Public Relations of the County Medical Society."

Dr. William H. Kraemer (Fellow), Wilmington, Del., addressed the Faculty Club of the University of Delaware, at one of its recent monthly meetings, on "Some of the Leading Problems in Medical Research of the Present Day."

Dr. Kraemer also addressed the Commission on Cancer of the State of Pennsylvania at the Moses Taylor Hospital on the subject, "The Medical Treatment of Cancer."

Dr. Kraemer is Director of the Tumor Clinic of the Jefferson Hospital of Philadelphia. The Tumor Clinic was founded through the creation of the "Elizabeth Storck Kraemer Memorial Fund," through the contributions by Mr. Pierre S. de Pont of \$25,000 for furniture and apparatus, \$10,000 additional toward fitting up the Department, and \$10,000 annually for five years toward the expenses of the practical work of the Clinic. Mr. Lamot du Pont also contributed \$15,000 toward the support of the work of the Clinic. "The object of this clinic is research for the advancement of the knowledge of cancer along lines of surgery, x-ray, radium and chemical compounds, such as lead, which study has been pursued actively at Jefferson Hospital during the last two years."

Dr. John I. Marker (Fellow), Davenport, Iowa, addressed the St. Louis Medical Society, Duluth, Minn., June 11, on "The County Contract for Care of the Indigent."

At the meeting of the National Tuberculosis Association at Syracuse, N. Y., during May, Dr. P. P. McCain (Fellow), Sanatorium, N. C., was re-elected for a two-year term on the Board of Directors, and Dr. L. B. McBrayer (Fellow), Southern Pines, N. C., was re-elected to membership on the Committee of Health Education.

The following Fellows of the College are members of the Board of Directors of the North Carolina Tuberculosis Association:

Dr. Paul Ringer, Asheville;

Dr. P. P. McCain, Sanatorium;

Dr. M. L. Stevens, Asheville;

Dr. S. D. Craig, Winston-Salem;

Dr. W. B. Kinlaw, Rocky Mount;

Dr. William H. Smith, Goldsboro;

Dr. L. B. McBrayer, Southern Pines.

Dr. Robert M. Moore (Fellow), Indianapolis, recently addressed the Tenth District Medical Society at East Chicago, and the Hancock County Medical Society at Fortville, his subjects being "The Heart in Surgery" and the "Management of Certain Types of Cardiac Cases," respectively.

Dr. Samuel E. Munson (Fellow), Springfield, Ill., was recently re-elected Councilor of the Fifth District of the Illinois State Medical Society for three years. Dr. Munson has held this office since 1925.

Dr. Oliver T. Osborne (Fellow), New Haven, Conn., has been nominated to the "Hall for Famous Men" of The Heckscher Institute for Child Health, New York City.

Dr. Curran Pope (Associate), Louisville, Ky., delivered a radiophone address on May 5 over station WLAP, at Louisville, under the auspices of the Woman's Auxiliary of the Jefferson County Medical Society; his subject being "The Conservation of Nervous Energy."

Dr. Pope was a guest of the West Virginia State Medical Association at their annual meeting in Clarksburg, W. Va., May 19-21. Dr. Pope discussed a number of papers on the program, and also delivered an address at the luncheon of the Rotary Club.

At the annual meeting of the Board of Trustees of Syracuse University in May, the following promotions were made in the faculty of the College of Medicine: Edward C. Reifstein (Fellow) to Professor of Medicine; Maynard E. Holmes (Fellow) to Assistant Professor of Clinical Medicine.

Dr. David Riesman (Fellow), Philadelphia, was elected President of the American Association of the History of Medicine at its recent meeting in Atlantic City.

Dr. Raymond W. Swinney (Fellow) has removed from Kansas City, Mo., to Long Beach, Calif.

Dr. Carl V. Vischer (Fellow), Philadelphia is co-author with Dr. Thomas J. Vischer (Associate), Philadelphia, of an article in the May Hahnemannian Monthly, "The VonPirquet Test; its Value as an Aid in the Diagnosis of Tuberculous Infection."

Dr. Conrad Wesselhoeft (Fellow), Boston, was appointed Associate in Communicable Diseases, Department of Pediatrics, Harvard University Medical School, on June 3.

"Forty Years as a Clinical Pathologist" was the title of a paper that appeared in the May, 1931, Issue of the Journal of Laboratory and Clinical Medicine under the authorship of Dr. Aldred Scott Warthin (Master), Ann Arbor, Mich., now deceased.

Dr. Carl H. Greene (Fellow) and Dr. Albert M. Snell (Fellow) (with Walters), Rochester, Minn., contributed an article to the same journal entitled "Functional Tests in the Surgical Diagnosis and Treatment of Diseases of the Liver and Bile Ducts."

Dr. Henry J. John (Fellow), Cleveland, also contributed an article on "Surgery in the Presence of Diabetes."

In the June issue of Radiology, the following Fellows contributed articles:

Dr. Thomas A. Groover, Washington, D. C.—"Radiology as a Career";

Dr. L. J. Carter, Brandon, Man., Canada —"The X-Ray Treatment of Essential Hematuria";

Dr. I. S. Trostler, Chicago, Ill.—"An Obscure Bone Case."

Among special guests listed in the preliminary program for the graduate course and clinical conference for general practitioners, held in St. Louis, June 15 to 26,

appeared the names of the following Fellows:

Dr. W. W. Duke, Kansas City, Mo.

Dr. William Engelbach, New York, N. Y.

Dr. L. G. Rowntree, Rochester, Minn.

Dr. B. B. Vincent Lyon (Fellow), Philadelphia, addressed the Medical Society of New Jersey at Asbury Park, June 3 to 5, on "Value of Duodenal Tube Drainage of the Biliary System and Treatment of Various Diseases and Disorders of the Liver."

Dr. Elias H. Bartley (Fellow), Brooklyn, recently retired as President of the Medical Board of the Kingston Avenue Hospital for Contagious Diseases. Dr. Bartley was a member of the Board for thirty years, and President for fifteen years.

Dr. Otis S. Warr (Fellow), Memphis, addressed the West Tennessee Medical and Surgical Association, May 20 to 22, on "Undulant Fever."

At the annual meeting of the Medical Society of the District of Columbia, May 6-7, the following Fellows of the College took part:

Dr. William Gerry Morgan, Washington —"Some of the Medicinal Effects of Alcohol";

Dr. Walter Freeman, Washington—"Malaria Treatment of Neurosyphilis";

Dr. Alexander B. Moore, Washington—"Gastro-intestinal Bleeding";

Dr. J. Russell Verbrycke, Jr., Washington—"Cardiospasm."

Dr. Arthur C. Christie (Fellow), Washington, was elected President, Mary O'Malley (Fellow), Washington, one of the Vice Presidents, and Dr. Coursen B. Conklin (Fellow), Washington, was re-elected Secretary.

Dr. Cecil M. Jack (Fellow), Decatur, Ill., addressed the Adams County Medical Society at Quincy, Ill., May 11, on "Value of an Observation Station in a Tuberculosis Sanatorium."

Dr. Julius H. Hess (Fellow), Chicago, spoke before the Pittsburgh Pediatric So-

ciety, May 11, on "Premature Infants as a Present-Day Problem."

Dr. J. A. Barga (Fellow), Rochester, Minn., addressed the Pennsylvania Radiological Society, May 13 to 14, at McKeesport on "Clinical and Radiological Aspects of Chronic Ulcerative Colitis."

Dr. Marr Bisailon (Fellow), Portland, Ore., used as his subject "Differential Diagnosis of Malignancy of the Lung" in an address, May 4, before the King County (Washington) Medical Society.

Dr. Charles James Bloom (Fellow) addressed the St. Tammany Parish Medical Society, June 12, 1931, on "Intestinal Disturbances in Infants and Children."

Dr. Louis F. Bishop (Fellow) and Dr. Louis F. Bishop, Jr. (Fellow) addressed the American Therapeutic Society at Atlantic City, June 5, 1931, on "A Study of Cardiovascular Syphilis in Private Practice."

Dr. G. L. Pinney (Fellow), Hastings, Nebraska, has been elected Delegate to the State Medical Meeting for the third successive year. At that meeting, May 14, he read a paper on "Cardiac Hypertrophy."

Dr. Leon T. LeWald (Fellow), Professor of Roentgenology, New York University and Bellevue Hospital Medical College, read a paper entitled "Gastric Lesions, Roentgen Diagnosis and Differential Diagnosis from Gastric Ulcer and Carcinoma" before the Connecticut State Medical Society at Bridgeport, Conn., on May 20th, 1931.

OBITUARY

DOCTOR FRANCIS XAVIER
DERCUM

Dr. Francis Xavier Dercum, world-famous neurologist, died suddenly on April 23, 1931, a few minutes after the closing of the executive session of the American Philosophical Society. As president of the Society he had read his report and was about to open formally the 204th Annual Meeting when the end came. Seated in the chair of Benjamin Franklin, the founder, in the presence of an audience made up of distinguished scientists and surrounded by trophies of America's scientific progress over the last two centuries, an impressive and dignified setting completely symbolic of his distinguished career, he suddenly collapsed and passed away without regaining consciousness. "He died," remarked a fellow-scientist, "as a scientist would wish."

Born in Philadelphia, August 10, 1856, a son of Ernest Albert and Susanna Erhart Dercum, Dr. Dercum attended the public schools of his native city and was graduated from the Central High School in 1873. At an early age Dr. Dercum resolved to study medicine and in 1877 was graduated from the Medical Department of the University of Pennsylvania, and in that year also won a Ph.D. from the same institution. While a student in the medical school, he devoted attention to scientific investigation and following his graduation this interest became a dominant attribute in Dr. Dercum, although he entered upon and for a number of years followed, the general practice of medi-

cine. He at once became a member of the Academy of Natural Sciences, Philadelphia, to which he made original contributions from time to time. In 1878 his ability as an anatomist was recognized by his appointment as an assistant demonstrator in the histologic laboratories under Dr. Richardson, and very soon thereafter he was appointed demonstrator in the laboratory of physiology under Professor Harrison Allen. Here he demonstrated practical histology, fungi, algae, protozoa, and bacteria, "thus obtaining a solid foundation in what was then the new science of bacteriology."

In 1883, at the request of his friend and former teacher, Dr. Horatio C. Wood, he directed his scientific studies to nervous diseases. Almost simultaneously he was appointed Chief of the Nervous Dispensary and Instructor of Nervous Diseases in the medical school of the University of Pennsylvania. While Dr. Dercum was holding this position, Muybridge began his studies of the movements of horses in the open lot behind the University Hospital. Muybridge also photographed for Dr. Dercum men exhibiting normal and pathological gaits as well as persons in convulsions. In order to get pictures of persons in convulsions, Dr. Dercum would induce them artificially by suggestion under hypnotism. He and his classmate, Parker, made a report on artificial convulsions before the Philadelphia Neurological Society based on these pictures, the first of their kind to be taken. He continued as Chief of the Nervous Dispensary and Instructor of

Nervous Diseases until 1892, when he was elected to the newly created chair of Nervous and Mental Diseases in Jefferson Medical College with the title of Clinical Professor and with a seat in the faculty. In 1925 he resigned this position and immediately became Professor Emeritus.

Dr. Dercum was a member of many learned societies both at home and abroad, holding membership in the Philadelphia County Medical Society, American Medical Association, Association for Research in Nervous and Mental Diseases, Historical Society of Pennsylvania, Franklin Institute, Zoological Society, Alpha Kappa Kappa, Wistar Association, Royal Medical Society of Budapest (1909), Royal Society of Medicine at London, corresponding membership in the Psychiatric and Neurological Society of Vienna (1911), and honorary membership in The Society of Physicians of Vienna (1921). He was elected a Fellow of the American College of Physicians in 1923. Dr. Dercum was neurologist to the Philadelphia General Hospital from 1887 until a few years ago, when he was made consulting neurologist. He was also consulting neurologist to the Jewish Hospital, Wernersville Sanatorium and State Hospital for Criminal Insane at Fairview. He was at one time pathologist to the State Hospital for the Insane at Norristown, Pennsylvania.

As a result of assiduous literary activity throughout his long career, Dr. Dercum published upward of 200 papers. As early as 1878 his scientific papers began to appear in *The American Naturalist* and in the *Proceedings of the Academy of Natural Sciences*.

They included articles on "The Sensory Organs, Suggestions With a View to Generalization" and "The Morphology of the Semi-circular Canals and the Nerve Terminations in the Lateral Sensory Apparatus of Fishes." In 1895 Dr. Dercum edited a textbook of nervous diseases by American authors. His later writings included "Rest, Suggestion and Other Therapeutic Measures in Nervous and Mental Diseases," 1904; a "Clinical Manual of Mental Diseases," 1914; "Hysteria and Accident Compensation," 1916; "Biology of the Internal Secretions," 1924; and "The Physiology of the Mind," 1925. The last named work met with world-wide appreciation among neurologists and biologists and showed the author's creative originality.

In 1892 he described the *Adiposis Dolorosa*, which bears his name and is referred to by French writers as "*Maladie de Dercum*." It may be said that though Dr. Dercum helped to give clinical observation recognition as a scientific method, he was not exclusively a clinician, but was much engrossed in scientific investigations into the causes and nature of pathological and physiological phenomena. With his friend, the late Dr. Mills, he was a pioneer in the study of nervous and mental diseases.

Dr. Dercum joined with Charles K. Mills, Wharton Sinkler, and others in founding the Philadelphia Neurological Society, which he served as president for a time. On December 4, 1908, Dr. Dercum was formally notified that he had been elected to the *Société de Neurologie de Paris*, composed of fifty leading nerve specialists

of the world. The only other American who has been elected to that body is Dr. Charles L. Dana of New York. During the World War Dr. Dercum rendered important service as a member of the Medical Advisory Board and lecturer to the Army and Navy Medical Corps.

Dr. Dercum became the president of the American Philosophical Society in 1927; here he found duties commensurate with his talent, and he manifested an insatiable love for the work. About one year ago he organized the American Philosophical Society's survey of mankind's intellectual progress. It may be truly said that he infused new life into this time-honored institution.

After paying tribute to Dr. Dercum's ancestors, many of whom became lawyers, judges, scholars, scientists, and physicians, and two of whom were professors in the University of Würzburg (an institution founded in 1582 and destined to be the place where Roentgen discovered the x-ray), J. Chalmers Da Costa* says, "He should have inherited predispositions to generosity, kindness, faithfulness, hospitality, patience, charity, courage and a love for science, music and romance. I believe that he has fulfilled the promises of his ancestry."

*Address delivered at a testimonial dinner in honor of Dr. Dercum's seventieth birthday, December 11, 1926.

Dr. Dercum was a man of unassuming person and demeanor. He was a popular man because of the natural sweetness of his nature and his propensity to embrace every opportunity for professional, public, and social diversion. His manner was refined and pleasing, and he was uniformly cordial to his troupes of friends, both in and out of the medical profession. Indeed, the health and well-being of many of the latter depended almost as much upon his kindly attention as upon his superior skill.

Although he constantly showed himself to be a man of profound intellect and breadth of view, we shall not understand his character nor his inner life unless we conceive him as one to whom the solution of abstruse problems, particularly in psychiatry and morbid physiology of mental and nervous diseases, was an insatiable desire.

His life had been complicated, for a period of several years prior to his passing, by physical infirmities, yet his spirit had ever risen above them, its fires being fed by God-given fuel, and his genius taking up, despite interruptions, the golden threads of tasks that death alone could terminate.

In 1892 Dr. Dercum married Elizabeth De Haven Comly, a member of an old Philadelphia family. Mrs. Dercum and two daughters, Mrs. Samuel W. Mifflin and Miss Mary De Haven Dercum, survive.

(Furnished by James M. Anders, M.D., M.A.C.P.)